Machine and Tool



BLUE BOOK

ESTABLISHED 1906



SEPTEMBER 1953

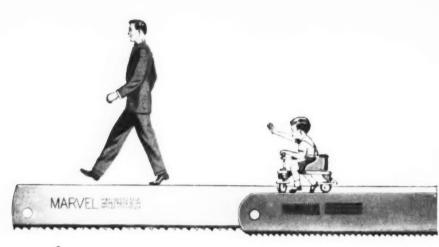
New-type Diamond Wheel Grinds to 1/4 in. Depth in One Pass Without Glazing

How to Braze Carbides

Operations at Victor Equipment Co.

Last Minute Washington News "Know-How" Reference Sheets

CONTENTS ON PAGE 5



Experience Cannot be Copied

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency many-fold.

Every MARVEL Hack Saw Blade ever sold has been of that basic welded high-speed-edge construction, with constant improvements from year to year, as EXPERIENCE augmented the "know-how"...

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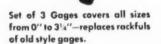
arice with Indicator graduated .0005" with jewel bearings and Tungsten Carbide anvils \$57.50.



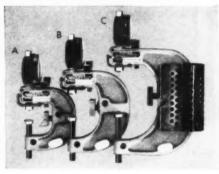
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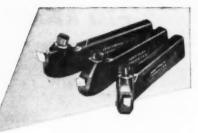
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Contents for

Featured in this Issue	How's Business
FEATURE	
How to Select the Proper SFM in Milling Operal Variations in Die Strippers, Shedders and Punc by Paul Prikos and Raymond Becker Brazing of Cemented Carbide Tools and Parts, Boring Large Tapers on Small Lathes, by Ton New Principle Reduces Tooling Needed for Ma Victor Equipment Company Cuts Cost, Increase	th Pad Designs, 164 by F. J. Lennon, Jr. 174 Brown 185 chine Operations 194 ss Production, by Fred M. Burt 219
New Diamond Wheel Grinds to a Depth of 1/6" by William F. Schleicher Special Report on Grinding Machines Causes and Correction of Common Grinding Er	229
MODERN TOOL	S IN ACTION
Fixture for radial drilling of tubs Low cost dust control possible with dust collect One operator, two end-finishing machines Kennametal flaring tool gives over 74 times lon Specially designed drill unit cuts costs 25% How stamping company uses Mead air pov Turning operation on cast iron crank New Baker performs multiple operations on cl Converts milling machine into external grinde	tor of right volume
SHOP	HINTS
Master bar speeds measuring of larger dimensizing tool overcomes spacer ring distortion Pin arbor speeds production Salvaging by heating Sharpening carbide masonry drills How to drill a hole through glass Double equalizing clamp	276 277 278 278 277 277
DEPART	MENTS
Available Literature 283 News of the Industry 301 What's New in Metalworking 329 Index to Advertisers	The Market Place 420 Mechanics Through the Ages 422 Products Index 430
FRIFADIA	LETAFE

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Hitchcock Managers are Listed on Page 64

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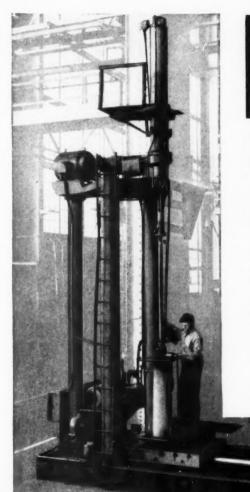
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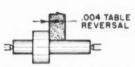
Grinding wheel spindle bearings are FILMATICS. They are dependable require no adjustment for any type of finish.



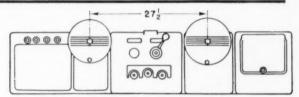
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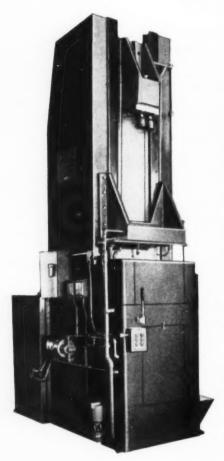
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tages of CINCINNATI FILMATICS are where. Brief specifications will be found in Sweet's Machine Tool

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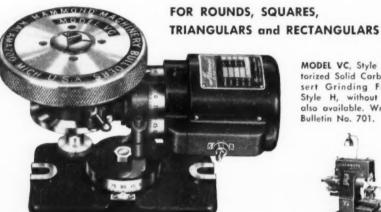
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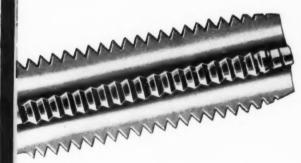
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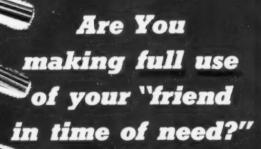
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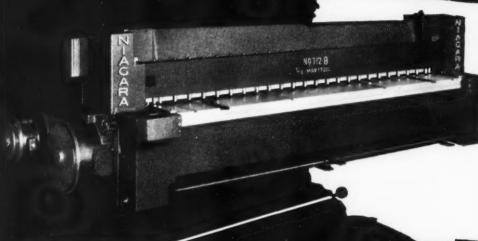
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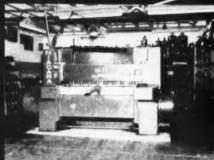
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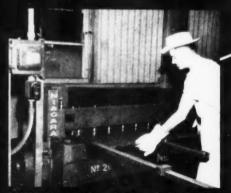
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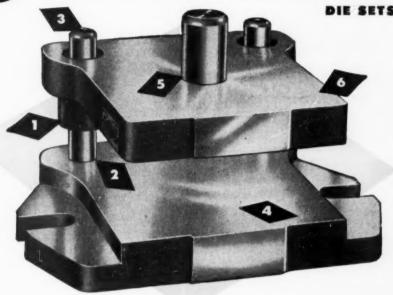
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To make an accurate die, an accurate die set must be used. For this reason, every Producto die set is an instrument of precision.

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5PD52B

September, 1953

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You'll like this rugged, break-resistant standard tooth blade for trimming gates and risers off castings, cutting metal bars and other tough production work. Hardened along the tooth edge only, it cuts fast, stays sharp, gives a longer run for your money! All standard widths and tooth spacings. Furnished in 100° and 300° coils or welded to length for specific machines.



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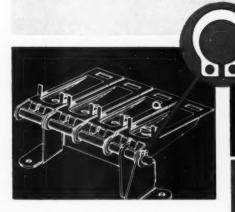


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Find out what Waldes Truare Retaining Rings can do for you. Send us your drawings. Waldes Truare engineers will give your problems individual attention without obligation.

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T DIAMETER	Bec. Equiv.	.125	.136	.187	.250	.312	.375
SHAFF	TOL	±.002	±.002	±.002	±.002	±.003	±.003
DIMENSIONS	į T	.025	.025	.035	.035	.042	.042
	# 10L	±.0015	±.0015	±.002	±.002	±.002	±.002
	Longth A	.268	.285	.364	.437	.553	.626
BING DIM	Lug B	.078	.078	.097	.097	.141	.141
	Hole	.042	.042	.042	.042	.078	.078
	Min. Ring & Clear	.33	.34	.44	.50	.67	.73
UH	Approx. tim Thrust oad (Lbs)	20	20	25	35	50	60



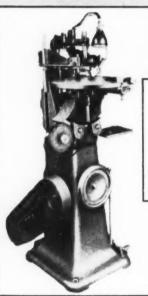
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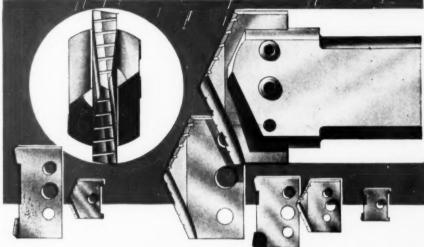
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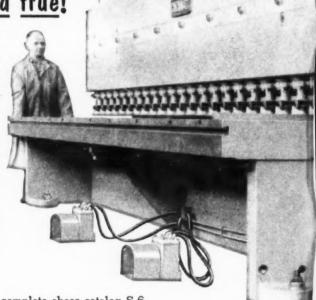
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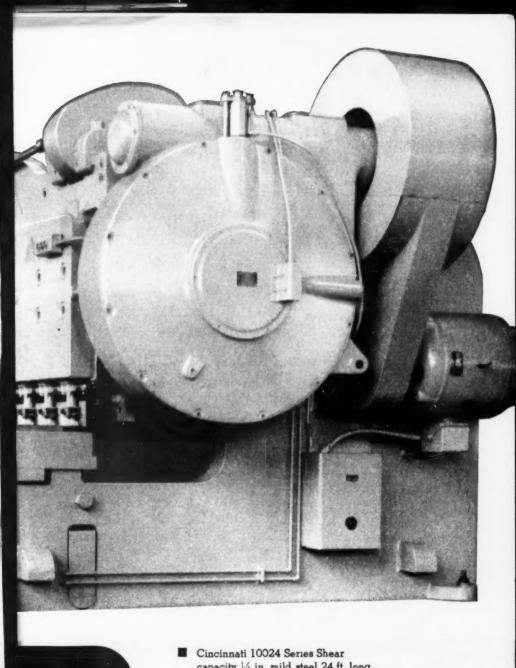
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Adjustment Spindies. Designed mainly for high speeds.



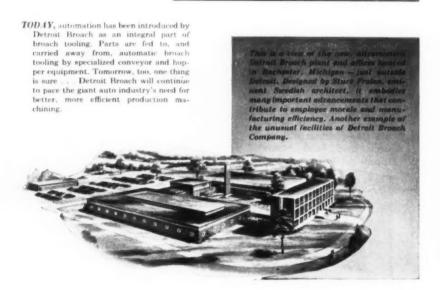
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Early, too, came recognition of Detroit Broach ingenuity and reliability in the design and manufacture of tooling that would pace production requirements. A small sample of that tooling is shown at the left.

in YOUR industry, too you will find many companies who rely on Detroit Broach to meet their needs for tooling

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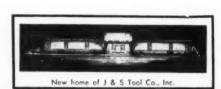
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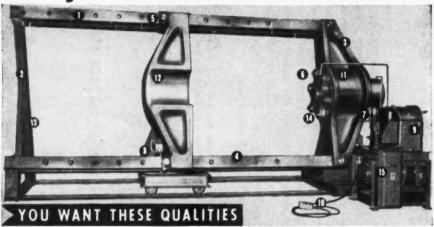
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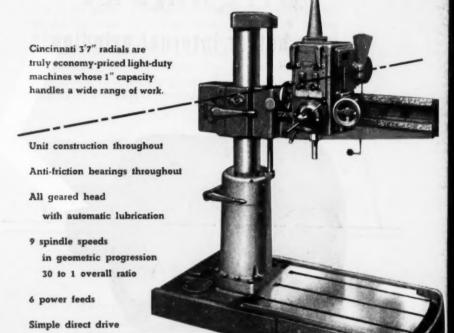
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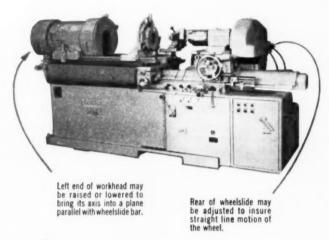
alignment

for better internal grinding



TO GRIND a taper, the internal grinder must be set up according to simple geometric principles; that is, the path of the grinding wheel must be a straight line and must intersect the axis of the workpiece at a point. In the illustration, the axis of the wheel path "a" and the axis of the work "b" lie in parallel planes. The axes cross, but fail to intersect. Under these conditions, it is impossible to grind a true taper. As the grinding wheel enters the large end of the taper, the point of contact is high. This end of the taper can be ground to size. As the wheel progresses through the hole, the contact moves even higher, with the result that the hole will be progressively oversize and a curve is generated instead of a uniform taper.

A taper ground under these conditions probably will blue only in the middle. Turning the workhead may shift this plug contact but, as the wheel wears, the plug contact will continue to move. The remedy is to correct alignment so the wheel path and wheel axis "a" and the work axis "b" intersect and lie in a plane which includes the diamond. Then a uniform taper will be generated. In shop practice the adjustment would be made by bringing the wheel and work to exactly the same center height.



This semi-automatic machine is for grinding bores in long parts and is adaptable for either production or tool room work. It will swing work up to 16" and grind bores up to 9" depth. The work is held in a standard hollow work spindle and steadyrest. The workhead may be adjusted longitudinally over a distance of 37" to meet the requirements of a large variety of work. It may be pivoted for grinding a taper up to 30° included angle. Hydraulic operation provides a wide range of traverse speeds. Write for folder.

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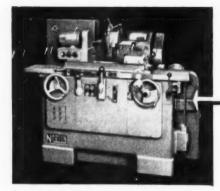
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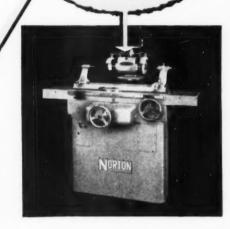
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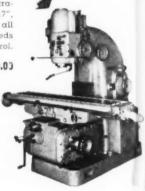
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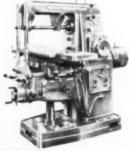
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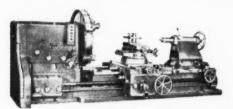


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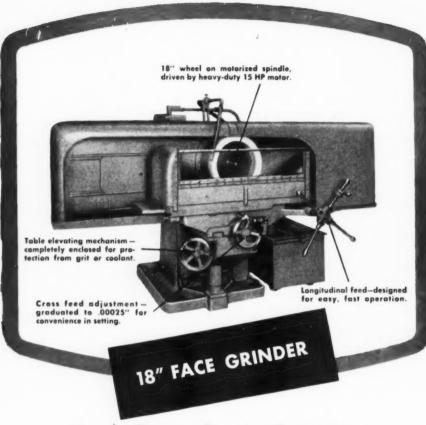
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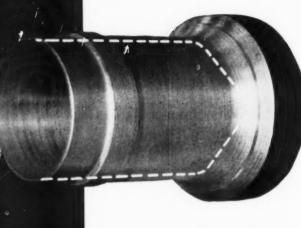
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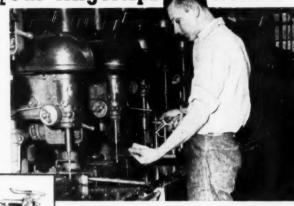
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* BY MACHINE OR HAND

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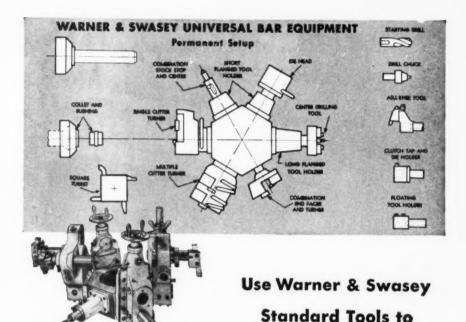
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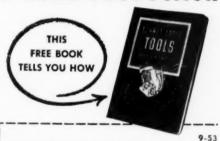


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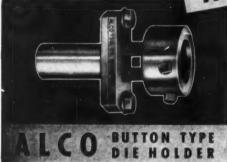
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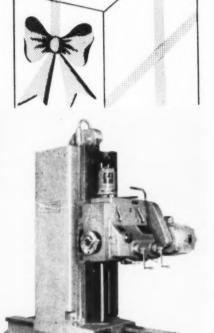
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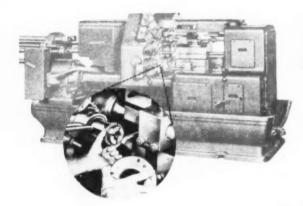
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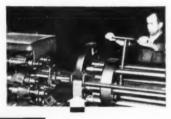
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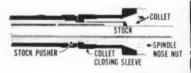


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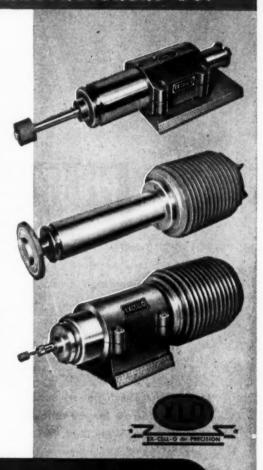
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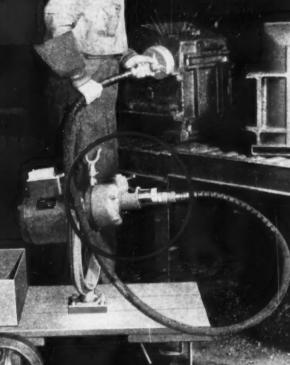
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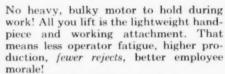




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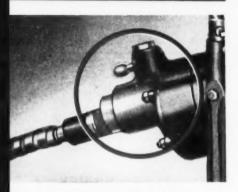
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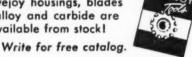






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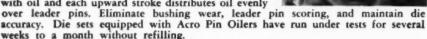




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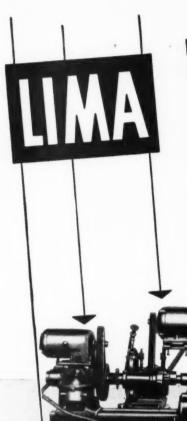
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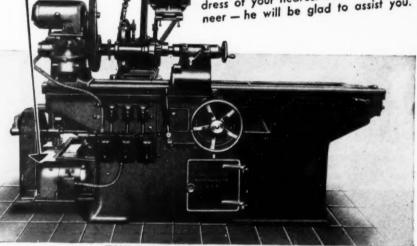


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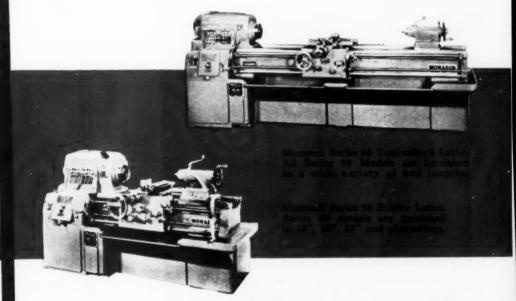
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4 Hardened, ground or shaved, wide helical gears in headstock —for precision power, easier shifting 7 All critical parts made of hardened alloy steel —for long, trouble-free life **Isn't it logical?** Aren't the costs and quality of your products directly affected by the sustained accuracy, speed, versatility and dependability of your turning equipment?

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The finest hand tapping machine made. In use in hundreds of shops, universities, experimental rooms and governmental agencies. GOOD FITS, RIGHT ANGLE HOLES, tapped to the correct depth with NO TAP BREAKAGE are achieved while using unskilled labor.

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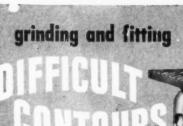
frames simultaneously. These savings can be yours too with a Pedrick Bender. Multiple bending is adaptable to almost all bending operations, including pipe, tube, reinforcing bars or structural shapes.

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WRITE FOR DESCRIPTIVE FOLDER DEPT. 3

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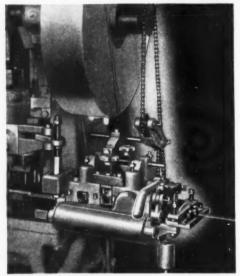


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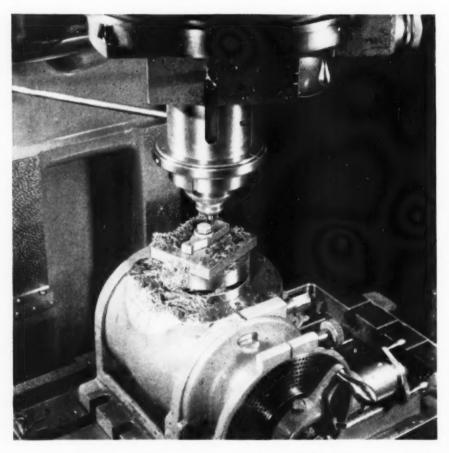
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Automatic
ROLL FEEDS AND
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PRODUCTION DATA		Valve Lever	Spindle S	peed 530 rpm
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Model D Cycle Time (floor to	loor) - 17 minutes	Previous c	vcle Time (f	loor to floor)-24 minutes

finish milled direct from single setup, in 17 min.

Kearney & Trecker Model 2D Rotary Head Milling Machine saves six hours on 50 piece run

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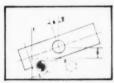
Address requests to Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wis.





If you have production problems in molds, dies, or selected production milling operations — investigate the Model 2D Rotary Head Milling Machine.

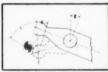




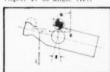
 MILL 20° ANGLE. Index piece to (A), offset spindle slide to (B), set head to (C), saddle to (D). Feed table (E) to (F),



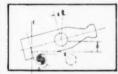
2. MILL.642/.645 DIAMETER Rotate head (C) to (H).



3. MILL 15% IN. RADIUS. Rotate head from (II) to (J), index head from angle (A) (Oper, I) to angle (K).



4. MILL 20° ANGLE, With piece at K1, more center of head to (L); rotate head to (M). Feed table (L) to (N),



5. E*ILL SAME FORM ON OPPOSITE END. Repeat operations I through 4.



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For vertical, horizontal and angular operations.

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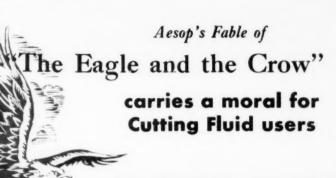
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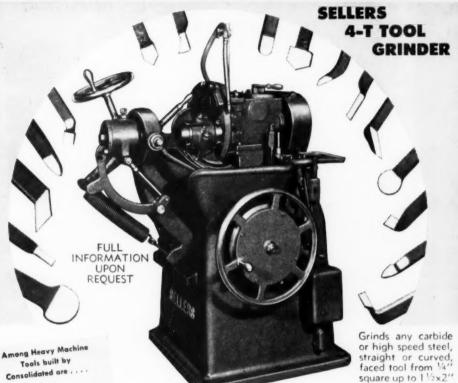
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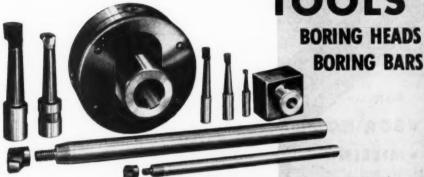
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Try Criterion Boring Tools. Built with the same care and quality as the time-tested Criterion Boring Head.

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Changes from one tool to another is a matter of seconds. Three point locking feature and tapered shank assures repositioning and eliminates "run out." Send for catalog describing individual holders and adapters or for specific information on your machine tools.

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IN THIS ISSUE

Variations in Die Strippers, Shedders, and Punch Pad Designs				
rau Designs				
Brazing of Cemented Carbide Tools and Parts				
New Diamond Wheel Grinds to a Depth of 1/8 in. in Carbide Without Loading	229			

Variations in Die Strippers, Shedders and Punch Pad Designs, by Paul Prikos and Raymond Becker, Prikos & Becker Tool Company, Skokie (Chicago) Illinois. As much emphasis must be given to strippers, shedders and punch pad designs as is given to the design of die blocks and sections. Some of the principles involved and some of the new thinking which has grown up around strippers, shedders and punch pads are discussed by the authors. Page....164

Brazing of Cemented Carbide Tools and Parts, by F. J. Lennon, Jr., General Superintendent, Kennametal, Inc., Latrobe, Pa. The article answers the many questions which are constantly being asked regarding the brazing of carbides. The article deals specifically with the methods used at the Kennametal plant in Latrobe. The article goes into considerable practical detail regarding brazing and should be of definite help to all who have a brazing operation in their own plant. Page174

Boring Large Tapers on Small Lathes, by Tom Brown, consulting tool engineer. An ingenious tooling setup to taper bore light alloy castings. Page185



The convenient centralized controls, the wide range of speeds and feeds, and the high visibility head of this Cincinnati Bickford Radial Drill are all contributing to fine performance on this job.

The Cleveland Pneumatic Tool Company say "Performance and ease of handling are all that could be desired."

On this cylinder for an aircraft nose type landing gear, drilling, reaming and spot facing operations are being done.

Cincinnati Super Service Radial Drills are accurate, powerful and profitable in the shop.

Write for Bulletin R-29.



RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

AS THE Editor SEES IT

Let's Open A Shop

Vacations are over. We've streamed back from the mountains, the seashore and the lakes and now that we're back we sit at our desks and think. "certainly, there must be more to life than just this." And we remember the cool mountain air, the lazy lolling on the beach, the lapping of the water against the old wooden dock. That was real living! A fellow could probably have a lot of that sort of thing if he had a shop of his own and could take off whenever the fish urged him.

So . . . let's open a shop!

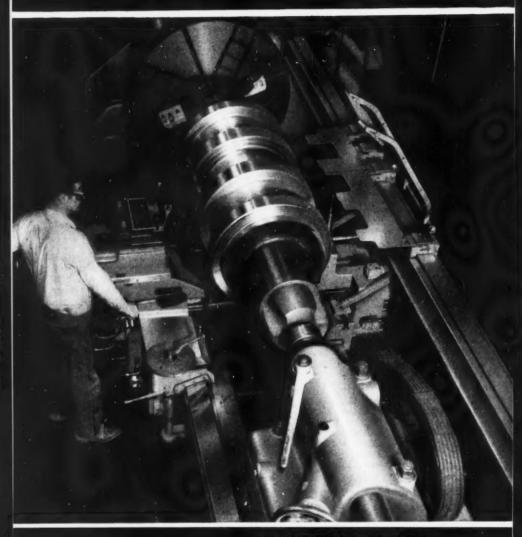
Tremendous advantages to having one's own business and being one's own boss. Gives you something to really work for. Gives you a real future. Be able to salt away a neat pile and whistle at the world in years to come. And it is of such dreams that success is made. Every business had its roots in dreams and men accomplished mighty things with stardust in their eyes. If only these were the prime ingredients of success. But they're not, and because they're not thousands of businesses fail each year.

Primary reason for the failure of businesses to weather the first year is the incompetence of the owner. He may be the world's best tool and die maker, have a wonderful new gadget, be able to work like a horse and get away with four hour's sleep and still be unable to prevent the hot winds from shriveling up his business and driving it away like tumbleweed. He was incompetent in the fields of selling, marketing, and managing; he didn't know enough about finance, law, inventories, accounts, credits, and literally thousands of other vital matters which are part and parcel of business management. I sometimes think if the man who plans to open a small manufacturing plant would think of himself as going into the business management field he would hesitate until he had probed and dug into the complexities which comprise business management. After all is said and done: it is important to know how to make a good product, but it's more important to the success of the business to know how to price it, market it, sell it. I am not a cynic who believes that no one should gamble on his abilities and that he should wipe the hope out of his eyes and do his dreaming in bed. I do believe a prospective proprietor should first know about the pitfalls ahead and then ground himself in the knowledge he'll need for a successful business venture.

I am reminded of what a president of a large successful corporation once told me: "A man planning to open a shop should know all about his profession, know twice as much about business management, and ten times as much about selling and marketing; lastly, he should be able to finance the venture at least six months."

William 7 Schleicher

LeBlond Lathe eases cost squeeze



A set of Shape toils of 30¼ "dia. x 51" body cast alloy semisteel are turned to 1005" tolerance in 34 hours on this 50" LeBlond Boll Contouring Lathe. Set-up time—¼ hour. Clamped-on and brouzed-on carbide tips are used at 48 rpm, 140 op feed. Conventional roll lathe took 245 hours for the same set of rolls.

squeeze channels from blooms

U. S. Steel Lops 151 Hours Off 245-Hour Roll-Turning Job.

Every day at U. S. Steel's Clairton Works, Clairton, Pa., miles of "hotter-than-orange" steel are squeezed through the passes of rolls like these for reduction, elongation, shaping. They come out as finished structural steel for the "jungle-gym" frameworks of modern buildings. Turning these costly shape rolls with their steep-angle contours used to keep a lathe running 245 hours on a set of roughing rolls at U. S. Steel. Tool life was short and the job required highly skilled operators. Stepped-up schedules called for a new solution to this tough-nut production problem.

A LeBlond 50° Roll Contouring Lathe, as recommended by Pittsburgh Distributor, Barney Machinery Co., immediately slashed the 245-hour turning time by an astonishing 61.7%. Now U. S. Steel saves 151 hours on one set of roughing rolls—more than enough time to turn out two more just like it. Tool life is greatly improved and less experienced operators can handle the work.

The 50° LeBlond Roll Contouring Lathe is equipped with two-directional hydraulic tracing. A single valve audit and controls two hydraulic motors for cross and length feed. A stylus follows a flat template mounted at the back of the lathe. Feed and speed can be varied during a cut without leaving a tool mark. For roughing,

Typical roughing rolls for 8" channel

hydraulic cross feed can be by-passed and length feed used separately. This enables operator to cross feed manually, use template as length stop. Mechanical power rapid traverse to carriage and cross slide is also provided. All controls are located conveniently at the apron. The lathe uses a 40 constant horsepower DC motor, has nine speed changes in the headstock, delivers infinitely variable speeds from 1 to 165 rpm.

Whether your turning jobs involve specialized production like roll-turning, or call for high precision, high production—investigate LeBlond's complete line of 76 lathe models. LeBlond engineers will help you get a better turning job, faster. Write today or see your nearby LeBlond Distributor.

Ask for complete information on Roll Contouring Lathes in 25°, 32°, 40° and 50° sizes.

Turned faster by



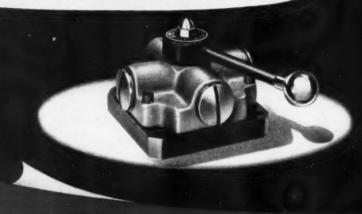
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ROSS OPERATING VALVE COMPANY

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LAST MINUTE WASHINGTON NEWS



by Arnold Kruckman

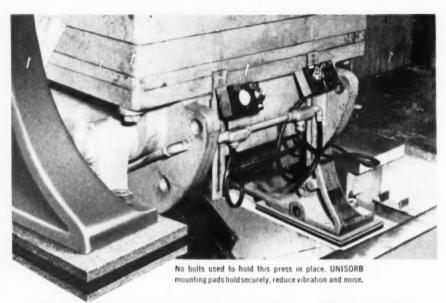
Washington Correspondent



The Government in Washington is very much like a housewife. You never know when you come home but that you will find the furniture all shifted around. In Washington, when you are not watching, they often put another label on an Agency which has become familiar to you as something entirely different. This happened August 1 when they rechristened the Mutual Security Administration the "Foreign Operations Administration." Thus, the MSA becomes the FOA.

With the change in name other implications of marriage have occurred. The Technical Cooperation Administration, which was a juicy and lucrative appendage of the State Department, became a part of FOA. So did the Inter-American Affairs Bureau become absorbed into the FOA. It will be recalled TCA was devised to put Point Four adventures into operation in so-called backward countries. It really, in many phases, so paralleled the ancestor of FOA that largely it was identical. Of course, the Inter-American Affairs Bureau was aimed at doing good in Central and South America, and at winning the good will of the other Americas by spending money upon them in many diverse ways.

The complicating aspect of this rather polygamous marriage of the Agencies is the fact that TCA and IAAB both started and were highly prized assets of the Department of State. The personnel not only were the traditional and conventional State Department staffers but most of them were New Dealers and Fair Dealers. On the other hand, the people who made up MSA—now FOA—also provided a strong leaven of ideologies that do not mix well with the State Department fantasies. At the time this is written the union is only four days old. What you might call the guys and dolls from the State Department purlieus are just trying to find themselves in the atmosphere of the less precious folk of the old MSA. The State Department crowd form by far the smaller group; but they are venerable in their knowledge of all the tricks of bureaucracy, plus the special knowledge which is acquired by the people who make the State Department. So, as far as Washington is concerned, the immediate prospect is



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regarded with more or less bated breath. There is every probability that the struggle to normalize the conditions in the new Agency will be historic. And the odds are against the State Departmenters.

In the reshuffle, another interesting thing has happened. Under the old deal the MSA maintained a large and experienced information staff in many countries of the world, but mostly in Europe. Also, as of August 1, there came into existence the U.S. Information Agency. At least in theory it is to combine all the information sections of all the major Departments, Offices and Agencies of the Government. There are more than 2200 of these separate parts of the Government. However, it is not intended, at this time, to divorce all information sections from all of these parts of the Government. The new information Agency takes from the new FOA all those Information Bureaus and specialists who are scattered around Europe and Asia. There is no reduction in their number—at this time; they simply operate under a new banner. Meanwhile, another Agency will come into existence shortly to act as liaison between the original Agencies responsible for the information people and the new U.S. Information Agency. The business man, whether he does business with the Government or not, should be interested in these complicated regroupings. Obviously, one of the reasons for the various actions is to reduce the cost of Government. Actually, we are told, by those who are in FOA and the other Agencies, that there is very little reduction in personnel, but that presently there is more confusion, and that the hope is there will be more efficiency in the future.

This discussion of the new incarnation of MSA is pertinent to the machine tool people for the reason that apparently machine tools have an increased commercial interest to the people of the Agency. They are helping to buy more for the countries of Southeast Asia as well as for other parts of Asia, the Middle East and the Near East. Before the unification, FOA could buy machine tools only for the group of countries in Southeast Asia. Now it buys them for all the countries of Asia and immediately adjoining territory.

The word is that machine tools have been purchased with American funds both by the Governments of the countries, and by the U.S. Agency, for countries like the Philippines, Formosa, Indonesia, Thailand and Burma; other Agencies, now combined with FOA, have procured the machine tools for India, Pakistan, Iran, Saudi Arabia and contiguous nations. It is understood FOA will now be the banker and the buyer for twenty-two countries of the Far East and the Near East. The fact that Congress cut the appropriations for what is now FOA does not, at this time, affect its banking abilities. Congress gave it, in the new appropriation, \$4,531,000,000; but it had a total of \$2,120,000,000 from previous appropriations which is unobligated and unspent. In addition, it has approximately \$12 billion in a fund which is labeled obligated but unspent. Thus it has a total exceeding \$18 billion. They tell us that the fund labeled obligated and unspent may largely become available as an unobligated fund because the emphasis of Government spending

has changed in direction, and that it is quite probable many of these obligations may be cancelled and the funds used for other things.

It is fascinating to follow the developments in the changing plans of Government banking and buying. Hitherto the emphasis has been on Europe. For instance, not so very long ago we were making plans to send machine tools to Italy; and a considerable number of the same to Belgium and Luxembourg, despite the fact that Belgium even has branches of American plants making machine tools. Other machine tool products were designed for Portugal; and still others for Germany. And of course, one of the principal destinations across the Atlantic for our machine tools was the United Kingdom which recently got \$7 million in MSA funds at one time for the purpose.

But Washington is convinced that the truce in Korea has made a great difference in our relations with Europe. It is generally expected the truce will be uneasily maintained without a real settlement leading to peace. The people here expect it will amount to a sit-down truce on either side. Even the Pentagon, off-the-record, regards Communist China as the real winner. It gives China the control over North Korea.

But the Communist Chinese also are the fly in the ointment which has made Europe unfriendly, according to those in

Washington who should know.

It should be easy to understand why machine tools for Asiatic countries are coming more frequently in the news (distributed by the Federal Agencies) than our machine tools distributed in Europe. For instance, during August FOA received bids for machine tools to be shipped to Thailand. One order that went to Viet-Nam in Indochina totaled \$1,120,000. Another order recently went to the Philippines; still another order to Formosa. One of the most interesting transactions was the procurement by Israel of a considerable number of machine tools to equip Israel's vocational schools. There are at least twenty-seven technical institutions in seventeen towns and cities of Israel where they have installed machine tools to help create a skilled labor force. M. Maldwin Fertig, president of the National ORT League, has been visiting the United States to persuade machine tool industrialists to equip some of these schools by donating as much of the equipment as possible. Mr. Fertig promises that every organization, or plant, which becomes a donor will have the school equipped with the machines named after the plant or the organization.

If you wish to make personal contact with those who handle machine tool affairs in FOA get in touch with Mr. W. R. Nolan, Chief, Industrial Construction Material and Aircraft Division of FOA, for any business in the Far East. You will find him in room 1207 in the building at 17th and H Streets, N. W., Washington, D. C., occupied partially by the B&O Railroad. In the same building, and on the same floor, you will find Charles Baker, who is in charge of any business connected with machine tools in Europe. The telephone is Sterling 3-6400; the extension for Nolan is 2541; for Baker, 2775.

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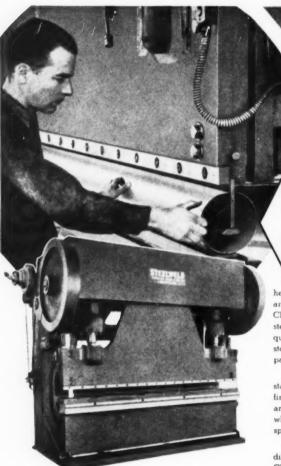
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Machine Tool Orders Increase

New orders for machine tools increased in June over May and April. However, while new orders increased in June, shipments declined. This was due to the declining backlog of orders which are slowly being whittled away. Shipments for June were at \$101 million as compared to \$106 million for May. According to reports from the machine tool builders, it is expected that shipments will find a level of around \$100 million per month. All of which is a sign that the industry will stabilize off the past few years' super boom.

Output Holds Up

Output, consumption and investment were at peak rates as the second quarter closed. In both dollar and real terms, output was higher with income also up. Construction topped the first quarter of 1952 by 8%.

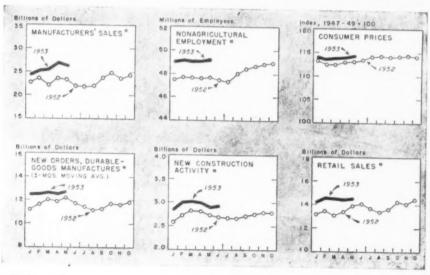
Output of major consumer goods in the

first half of 1953 was about 40% higher than in the corresponding period a year earlier. In the second quarter production eased off moderately as temporary work stoppages affecting the flow of parts slowed down automotive assembly lines. Some cutbacks occurred in household appliances.

Demand for automobiles is higher than it was last year. For the first six months of this year assemblies totaled 31/4 million.

For other major consumer durables beside autos the supply-demand picture is less rosy. While production of consumer durables has kept pace with production of autos, the demand has been limited, with the biggest drop in television sets.

Employment continues high. The June figures on employment show that the usual seasonal expansion at this time of year absorbed the influx of temporary workers into the labor force during the summer



September, 1953

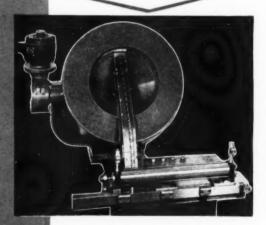
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Index of new orders and shipments of machine tools

source: Nation	al Machine Tool B	uilders Association		Ratio Unfilled Orders to
Month	Domestic	Foreign	Shipmenta	Demonstrated Production Rate
April	293.5	15.6	307.9	14.8 - 1
May	284.6	31.4	323.0	13.6 - 1
June	342.9	20.3	330.8	12.6 - 1
July	374.6	14.9	257.2	12.6 - 1
August	309.1	22.7	314.8	12.4 - 1
September	302.4	23.1	368.6	11.8 - 1
October	243.3	22.5	338.2	11.1 - 1
November	205.4	14.3	342.5	10.3 - 1
December	225.2	19.6	355.0	9.8 - 1
January	255.8	26.3	361.6	9.4 - 1
February	282.1	22.9	354.5	9.0 - 1
March	323.3	17.5	375.7	8.5 - 1
April	276.8	13.9	372.7	8.0 - 1
May	246.4	14.7	356.4	7.7 - 1
June	p. 272.8	p. 16.4	p. 341.1	p. 7.2 - 1

months. Estimated at 63.2 million by the Census Bureau, total civilian employment was about 1½ million higher than in May. A marked upswing in agricultural employ-

ment accounted for most of the month's employment gain.

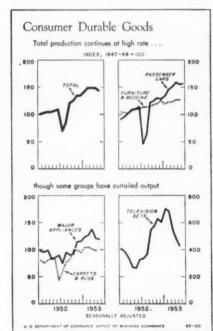
After Korea

Even before the actual signing of the truce, bankers, industrialists and government observers tried to chart the possible reaction upon business of the Korean truce. To sum up the findings of many different organizations is quite simple: no one seems to expect any great change from conditions before the signing. Opinions are based on several factors: domestic sources (other than defense industries or government) are taking up the slack left by the stretch-out of government procurement; military spending will not stop but will continue.

The government will continue to be in business obtaining aircraft, ships, artillery, construction, machine tools, etc. It is expected that government spending in 1954 will be equal to spending during 1953. And remember, defense spending in 1952, was larger than defense spending in 1952.

Too many people have been under the impression that defense spending has been enormously high; actually, defense production accounts for only about 7 to 9% of all output. It must also be borne in mind that the big cutbacks have already been made in tanks, aircraft and other vehicles.

Tool and die shops, always the first to notice a shift in wind direction, say that the reduction in government contracts has





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been counteracted by civilian procurements. The slack is being taken up nicely.

On the other hand, some industries will feel a letdown, although it cannot be said that the signing of the truce has any bearing on the reason for slackening demand. Appliances, led by TV sets, are showing a decline. However, no one believes that appliances are a warning of events to come.

Some gloomsters are looking into dark corners for bogeymen. They point out the drop in farm incomes, the slow sales of appliances, the slower housing starts, the feeling of belt-tightening among consumers, big pile-up in used car lots, high rate of business failures in June, difficulty of obtaining money, drop in exports. These pessimists see horrible monsters in the return to a buyer's market. However, the majority of businessmen view the future with optimism, discount pessimistic talk. They feel the future looks good enough to eat.

The Automotive Industry

There's a bit of confusion about Detroit. While some auto producers are at a standstill, others are moving ahead. Hudson and Kaiser are at a complete standstill while Packard and Studebaker are increasing their schedules. Hudson suspended operations for a model change; Kaiser is integrating its operation with Willys; Nash appears to be overstocked and is waiting for things to settle. Ford and GM are going at top speed.

Farm Machinery Trouble

Schedules have been cut back and personnel laid off by some of the producers of farm equipment. Dealers report lagging sales and have resorted to price slashing in order to move stocks.

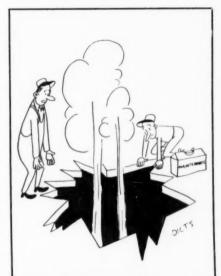
Last year farmers bought \$2.6 billion of new machines but drought conditions in the Southwest, shrinking commodity prices will cut deeply into farmers' incomes and consequently into farm machinery output.

International Harvester is planning to close some of its plants and lay off approximately 2,300 men between now and September 1.

Oliver Corp.'s tractor output is off almost 50% from a year ago. Massey-Harris is down about 15% over last year, while J. I. Case is about 25% down with a corresponding layoff in workers.

Mechanics Through the Ages

A collection of 63 of the more popular mechanics cartoons published in the MACHINE and TOOL BLUE BOOK over the past few years. Bound in a hard-cover it withstands constant wear. Cartoons are instructive, entertaining and make worthwhile reference tools. Available from Hitchcock Publishing Co., 222 E. Willow Ave., Wheaton, Ill. Price: One dollar.



"I told you last week the downstroke needed an adjustment."



Drilling Reports

I received the Drilling Machines Report and went thru it quite carefully to acquaint myself with its contents. Like the issues on other machine tools, it is a fine piece of work. Everyone who receives these publications cannot help but feel that a lot of hard work is needed to assemble all this information and present it in intelligent style, as your publication is doing.

In calls on shop men, I find that many of them keep these booklets handy for reference purposes. In fact, I would say that if you want to buy a lathe, for instance, one could inform himself on all the best makes by reference to your booklet on lathes and then get all the preliminary price information from the Government machine tool price index printed by OPS recently.

Having been in the machine tool field for 42 years, I have a pretty fair collection of machine tool catalogs and circulars; however the many changes during and since the last war make practically all of them obsolete; now you came along and brought a good part of this valuable information up-to-date and if anyone in the industry, either selling or buying, does not use it as a reference work, he is overlooking a good bet.

The reward for the kind of work you are doing with these booklets rarely comes immediately, you get it over a period of time in the form of good will by those who have benefited by it. I would not part with my copies.

P. P. Wagener, President P. P. Wagener Machine Tools

Improves "Who-When" Cards

The letters to the Editor in your May issue brought to my attention the two sayings, "Who, if not you?—When, if not now?"

I should appreciate receiving this card from you. May I make an added remark about another saying, "Where, if not here?" and possibly another, "What, if not this?"

> A. R. Griesbach, Projects and Methods Dept. Tinnerman Products, Inc.

Do you at this late date still have any "Who, if not you?—When, if not now?" cards on hand? If so, may I please have three or four of the cards containing the slogan?

Harold T. Jenkinson, Purchasing Agent Projection Gages, Inc.

I should be obliged if you would send me a copy of the sign, "Who, if not you? —When, if not now?" as mentioned in your article. As the Editor Sees it.

> F. McLarey, Plant Superintendent The Herbert Morris Crane & Hoist Company

Your editorial certainly highlighted the work which can be done when procrastination is not present. If the supply is ample I would appreciate very much receiving a print of your "Who—When" card.

M. E. Wertz, Master Mechanic Lehigh Structural Steel Co. Another batch of reprints has been made of the "Who-When" cards and copies have gone out to all those requesting them.

Who Makes It?

We would like to ask a little favor from you—whether you could investigate if a surface grinder by the name of T.M.L. or Thornton Mechanical Laboratories is now being made in Chicago. Formerly, this surface grinder was made in New Britain, Conn., but a Chicago concern purchased the rights of manufacture. If you can find out the name of the manufacturer it would help us.

Robert Parks Parks & Green Co.

The surface grinder you mention is now being manufactured by Thornton Mechanical Laboratories, Inc., 1744 N. Kimball Ave., Chicago, Ill.

We would appreciate it if you could advise us as to any firm that manufactures the square I.D. bushings with round O.D. that are used for making boring bars or special tools which may require adjustable square tool bits.

Dave Weinfeld J. W. Appley & Son

The item in question is manufactured by Sturdy Broaching Service, 23516 Telegraph Road, Detroit 19, Mich.

We are interested in brush making machinery such as automatic twisters, etc. I wonder if you could give us the names of some firms that might be making this type of machinery.

> Andrew Martin Metal-Wood Mfg. Co.

Suggest reader Martin contact: Carlson Tool & Machine Co., W. State at Anderson, Geneva, Ill.; American Brush Machinery Co., Inc., 37-39 N. 2nd Ave., Mount Vernon, New York.

Bemoans Lack of Craftsmanship

I read your editorial in the July issue with considerable interest. I think that unions have stymied the ambition of many workers. As long as the union guarantees them security, why should they try to improve themselves? However, another danger is creeping into our industrial life and that is the lack of craftsmanship. I read a report by an American group who went to England to study work methods. They reported that the English could learn quite a bit from us but that we in turn could learn just as much from the British. One thing they noticed was the pride of workmanship displayed by the British workmen in contrast to American workers. It seemed that the British workers wanted to do a good job and took it as a personal insult if the work merely slipped through by being merely, "passable,

In England a worker takes pride in his work and in his profession. In this country any guy who can hold a hammer calls himself a carpenter and any sap who can punch a timeclock calls himself a machinist. Even the men now in the various businesses of the country don't care whether their work is good or bad—get it done fast, get paid a heavy price, and get out in a hurry.

Engineering progress is a wonderful thing but I wonder if we haven't engineered ourselves to a point where we make our products "just good enough to pass"?

While I don't always agree with your editorials I think they're well written and at least show the application of thought.

James H. Smythe, Tool Engineer Homewood, Ill.

Compressed Power

Will you please tell me how I can obtain the booklet, "Compressed Air Power in Industrial Production"?

I would also like to obtain a copy of the article beginning on page 200 entitled "Case Histories Calculate the Dollar Wisdom of Using Portable Air Tools."

Joseph E. Mantiglia Monogram Air & Power Equipment, Inc.

The booklet, "Compressed Air Power in Industrial Production," is obtainable at no charge from the Compressed Air and Gas Institute, 1410 Terminal Tower, Cleveland, Ohio. Copies of the "Dollar Wisdom" article have been sent.

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C1213—The open hearth equivalent of B1113, Machinability slightly better. Cold working properties much better.

B1112—The standard Bessemer screw stock on which machinability ratings of other steels are based.

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Your nearby Ryerson plant offers quick delivery of the fastest cutting steels on the market —steels that will boost man-hour production; save you money.

Carbon steels, alloys, stainless—which ever you need, Ryerson is your best source. Take Ledloy for example. This open hearth steel machines at surface speeds of 300 feet per minute or better, making it the fastest cutting steel available today.

Similar in chemistry to C1213, Ledloy contains a very small amount of lead which acts as a lubricant between steel and cutting tool. You get greater production, longer tool life and a better finish on machined parts. In addition, Ledloy can be case hardened, bent or swedged.

The wide selection of other free-machining steels in Ryerson stock—ready for quick shipment, is indicated by the brief list at left. And remember, our steel specialists are always glad to work with you on any machining problem.

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How to Select the Proper SFM in Milling Operations

THIS ARTICLE will deal with surface foot rate, its nature, calculation and selection for milling operations.

Surface foot rate, commonly designated by the abbreviation s.f.m., refers to the velocity of the cutting edge on the periphery or outside diameter of the milling cutter. In figure 1 a milling cutter is presented in a line drawing in which one tooth only is shown. The cutting edge or point at A is under consideration in this discussion of s.f.m. How fast does point A revolve in feet per minute when this tool is being used as a milling cutter? Point A travels in one revolution as many feet as there are in the circumference of its circle. And the circumference of a circle is equal to the diameter times the constant 3.14. In other words, the circumference of every circle is 3.14 times larger than its diameter. If, therefore, a circle has a diameter of 3.821" (approximately) then its circumference is 12". (Multiply 3.821 x 3.14 and the result will be 12.) In such a circle point A in making one complete revolution travels 12" or 1'. If, therefore, this cutter is set on the spindle of a milling machine and the spindle speed is set at 500 revolutions per



By H. A. Frommelt, President H. A. Frommelt Associates Chicago

minute then point A will travel 500' each minute. Since it travels 1' in one revolution it will travel 500' in 500 revolutions.

This is termed the surface foot rate or the surface feet per minute of this cutter. In other words, the s.f.m. of a cutter having a diameter of 3.821" and which is set at a speed of 500 revolutions per minute is 500. This means that the cutting edge is traveling at the rate of 500' each minute.

Cutter Size Affects S.F.M.

The wear on the cutting edge of a tooth in a milling cutter is affected by its s.f.m. There are other factors affecting this wear but the s.f.m. is cer-

Table 1

Material	Carbon Tool	H.S. Steel	Cast Material	Carbide
	s.f.m.	s.f.m.	s.f.m.	s.f.m.
Plastics		10,000	15,000 15,000	20,000
Aluminum	5,000	10,000	15,000	20,000

tainly one of the more important determining circumstances in cutter wear. Hence it is important when setting up a job to determine the proper cutter speed or s.f.m. Note that the diameter of the cutter chosen for an operation will depend largely upon the size and nature of the job. In other words, if we are to mill a piece 2" wide a cutter in the neighborhood of 4" in diameter will be chosen. On the other hand, if a part is 12" wide an 18" diameter cutter (approximately) will be selected.

Assume for the moment that the same material constitutes both the 2" and 12" wide jobs. Generally speaking, therefore, the s.f.m. selected will be the same. Let us assume for the moment also that this s.f.m. is 500' per minute.

If the 2" job is under consideration and a 4" diameter cutter is chosen then

with a s.f.m. of 500' the spindle speed will be approximately 500 revolutions per minute. A 4" diameter cutter has a circumference of 12" (plus) or 1' and consequently the spindle speed will then be 500 revolutions per minute. On the other hand a 12" diameter cutter has a circumference of 3' plus (37.68") and hence the spindle speed for 500 surface feet will be approximately 165 revolutions per minute.

Note, therefore, while the s.f.m. for both these operations is the same the spindle speed varies from 500 to 165 because of the change in cutter size.

To summarize: it is important to note that the very first step in properly setting up speeds and feeds for a milling operation is to choose the proper s.f.m. Once this is done the spindle speed of the milling machine will be determined by the diameter of the cutter required for the job in hand.

What Determines Correct S.F.M.?

This choice of the correct s.f.m. is influenced by the following factors:

- 1. Material being machined
- 2. The material used in the cutting tool
- 3. The type of cutter required by and selected for the job
- The metallurgical characteristics of the material (this will have to do with type of material, heat treatment, tensile strength, etc.)
- 5. Machine type and condition
- Work piece type and condition (physical factors)

An understanding of these factors with some experience in their application will make the selection of the

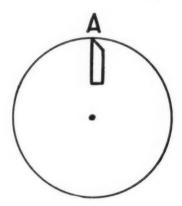


FIG. I

Table 2

Material	Carbon Tool	H.S. Steel	Cast Material	Carbide
	s.f.m.	s.f.m	s.f.m.	s.f.m.
Copper	2,500	3,000	3,500	10,000
Brass	2,000	2,500	3,000	5,000
Bronze	1,500	2,000	2,500	4,000

proper s.f.m. simple and easy of achievement. It will be our purpose to provide all the necessary data in the form of tables as well as a simple explanation of the information contained in the tables necessary for the proper s.f.m. selection.

1. Material Being Machined

This obviously is one of the most important since the difference between the speed called for in the milling of a nonferrous material, such as plastic or magnesium, as compared with a heat treated alloy ferrous material is immediately obvious. Table 1 presents the s.f.m. called for in the milling of aluminum, magnesium, and plastics. These can be grouped together since there is no known upper limit for these materials. (We are here referring to the non-alloyed aluminum materials; the currently used ST 75 aluminum copper alloy presents special difficulties and is considered elsewhere.) S.f.m. as high as 20,000 feet per minute have been used in the milling of these materials. There is no evidence that higher s.f.m., even doubled and trebled, would have any damaging influence or effect upon cutting characteristics and cutting teeth. Nevertheless, 20,000 surface feet represents an upper practical limit because of the spindle speeds involved, particularly for cutters of normal diameters ranging between 4" and 8".

In Table 2 the s.f.m. suitable for a second group of nonferrous materials is presented. This group includes bronze, brass, their alloys and such alloys of aluminum as the currently used ST 75.

Note that all of the s.f.m. tabulations in tables 1 and 2 assume a component without thin wall sections. In other words, it is solid and can be rigidly held. Variations from this norm or standard will be considered elsewhere.

The ferrous materials can generally be divided into cast iron, steel and their alloys. Each of these has numerous variations and therefore calls for variation in the selection of the s.f.m. It is in the ferrous groups that we first come upon the necessity for basing our determination of the s.f.m. upon the common characteristic, the hardness. This is usually expressed in terms of either Brinell, Rockwell or Sclerescope.

In Table 3 the speeds to be used with carbide milling cutters for various b.h.n. hardnesses are given. Table 4 gives the same information for h.s. steel; Table 5 for the cast cutting materials; and Table 6 for carbon tool steel.

Note that the above data must be tabulated in terms of four basic groups of cutting materials: carbon tool steel, high speed steel, cast cutting materials and carbide.

Carbon tool steel calls for the lower s.f.m. determination, high speed steel the next (and this includes super high speed steel), the cast cutting materials such as Steilite, etc., and finally the cemented carbides.

Generally speaking, if we know the type of material specified for the job in hand and the kind of cutting material available the s.f.m. can be pegged fairly close to the final and correct

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Table 3
Carbide Face Milling

B.H.N.	4" sim	dia. rpm	6" sfm	dia.	8" sim.	dia.	12" sfm	dia.	18" sfm	dia.	
500	80	80	80	55	80	40	80	27	80	18	
	120	120	120	80	120	60	120	40	120	27	
425	95	95	95	65	95	50	95	32	95	21	
	130	130	130	85	130	€5	130	43	130	29	
370	120	120	120	80	120	60	120	40	120	26	
	170	170	170	115	170	85	170	43	170	35	
325	165	165	165	110	165	80	165	55	165	36	
	240	240	240	160	240	120	240	80	240	53	
275	240	240	240	160	240	120	240	80	240	53	
	350	350	350	230	350	175	350	116	350	77	
250	330	330	330	220	330	165	330	110	330	73	
	430	430	430	290	430	215	430	113	430	95	
220	430	430	430	290	430	215	430	113	430	95	
	475	475	475	315	475	240	475	125	475	106	
180	475	475	475	315	475	235	475	125	475	106	
	500	500	500	330	500	250	500	166	500	112	
150	500	500	500		500	250	500	166	500	112	
	600	600	600	400	600	300	600	200	600	133	

figure. Other factors must be taken into consideration but these do not have a basic determining influence upon s.f.m. selection.

We have here included carbon tool steel because while there is little of it used at the present time there are some instances where carbon tool steel can and should be used. There are instances of special tools that are to be used only briefly and whose first cost in any other cutting material would be too expensive. Carbon tool steel can and should be considered under these circumstances. It is also justifiable to consider carbon tool steel if the teeth in the cutter are to be hard chrome plated.

2. Material Used in Cutting Tool

Let us consider the first of these, namely, the use of carbon tool steel for special cutters. Form cutters at times are demanded by the type of operation to be performed and no other tool will do. Instead of using an expensive high speed cutting material or even the more expensive cast and cemented carbide materials it is justifiable to specify carbon tool steel when

the operation is not a mass production job.

Likewise carbon tool steel is ideal if the hard chrome plating of the cutting edge is specified. This is not only justifiable but at times the more economical cutting tool. Carbon tool steel is relatively inexpensive and if properly heat treated for strength it can present respectable life if the cutting edge is properly hard chrome plated.

The high speed cutting material series includes not only the so-called high speed but also the later development referred to as super high speed steel. These cutting materials are too well known to justify a lengthy and detailed exposition in relation to the s.f.m. The established rates at which these materials can be used are well known and have been proven over long years of trial and experience.

One variation is to be noted and that is when a refrigerated material can be specified. If temperatures as low as 100° below zero can be used to bring about a change in crystal sizes and structure then the Rockwell C hardness can be increased from 63 to approxi-

mately 65. This results in increased life or, what amounts to the same thing, the s.f.m. can be increased proportionately for the same life.

The cast cutting materials such as Stellite are also well known and their characteristics in the machining of such materials as cast iron require little explanation. The disadvantage, if it can be called that, of these cast materials is the fact that they cannot be put into form other than by casting. The final preparation of the cutting tool or tooth in the instance of a milling cutter must be accomplished by a specialized grinding operation, generally with a diamond wheel.

The cemented cartides or the tungsten carbide which is generally used for cast iron and the tungsten titanium carbide which is used for steel have now become quite well known and are in somewhat general use in American industry. These materials have many advantages if properly used. Their great disadvantage, if this again can be called a disadvantage, is the specialized grinding demanded by these materials. Tungsten carbides have made possible a five-to-twenty-fold increase in the metal removal rate. And this could generally characterize American industry in its metal removal operations if better grinding techniques were more commonly available and used.

3. Type of Cutter

The third determining factor in the selection of s.f.m. is the type of cutter demanded by and chosen for the job. A flat surface can be milled either with a so-called face mill or a slab mill. If the latter is chosen the s.f.m. will be considerably reduced. This is indicated in the tabulation shown in Table 7. While there seems to be little justification for the choice of a slab mill for the milling of flat surfaces these sometimes are used and occasionally may be justified. Whether justified or not,

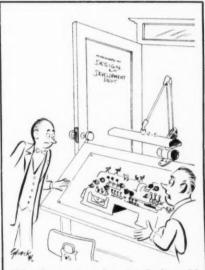
if a slab mill is used the s.f.m. will be from 25% to 50% lower then than selected for a face mill performing the same operation.

Form cutters will always carry a reduced s.f.m. as compared with a face mill which can be considered as the norm or starting point for s.f.m. determinations.

One of the determining factors in cutter life is chip disposal. In a form cutter chips are very troublesome and seldom ejected or freed from the work piece properly and effectively.

All end mill operations in milling which approximate a drill will carry reduced s.f.m. This is particularly due to the inadequate support of the end mill. The longer the end mill, the greater the distance from the shank, the less support and therefore the lower the s.f.m. will be.

A straddle milling operation, though apparently made up of two face mill-



"His theory is: when in doubt, add handles."

Table 4
High Speed Steel Face Milling

							_				
B.H.N.	4" sim	dia. rpm	6" sfm	dia.	8" sim	dia.	12" sim	dia.	18" sfm	dia.	
500	16	16	16	11	16	8	16	5	16	4	
	24	24	24	16	24	12	24	8	24	6	
425	19	19	19	13	19	9	19	6	19	5	
	26	26	26	17	26	13	26	9	26	6	
370	24	24	24	16	24	12	24	8	24	6	
	34	34	34	23	34	17	34	11	34	8	
325	33	33	33	22	33	16	33	11	33	8	
	48	48	48	32	48	24	48	16	48	11	
275	48	48	48	32	48	24	48	16	48	11	
	70	70	70	46	70	35	70	23	70	16	
250	66	66	66	44	66	33	66	22	66	14	
	86	86	86	57	86	43	86	28	86	19	
220	86	86	86	57	86	43	86	28	86	19	
	95	95	95	64	95	47	95	32	95	21	
180	95	95	95	64	95	47	95	32	95	21	
	100	100	100	67	100	50	100	33	100	22	
150	100	100	100	67	100	50	100	33	100	22	
	120	120	120	80	120	60	120	40	120	27	

ing metal removal jobs, will demand a lower s.f.m. The farther from the column face a cutter is located the greater will be its vibration on the arbor and therefore the slower the cutter must revolve; hence, the lower s.f.m. selected. As a matter of fact, in every straddle mill operation the cutter farthest from the column face will wear and dull faster than the cutter closest to the column face.

Thus the shape, nature and character of the cutter will influence the s.f.m. selection. This is obviously true and must necessarily follow from the very nature of the metal removal operations performed with the various types of cutters. It must always be remembered that the rigidity and stability of the cutter is an important factor in its correct operation. If the cutter does not have inherent rigidity and stability then the s.f.m. must be lowered below the normal selected for the material in hand. Any cutter selection that demands that a cutter be so located on a machine that it is bound to vibrate will seriously affect the s.f.m. determination. The reduction in the rate at which this cutter is revolved may be as much as 75% depending upon the nature of its location on the machine. Thus, a face mill located directly on the spindle nose of a horizontal milling machine can be operated at a much higher s.f.m. relatively than the same cutter set on an arbor away from the column face. This condition is compounded if two cutters are located on an arbor such as is demanded by a straddle mill operation.

4. Metallurgical Characteristics

By metallurgical characteristics we here refer to (1) its hardness, (2) its heat treatment, (3) its tensile strength.

The first of these is perhaps the most important. Table 8 presents the s.f.m. in relation to Brinell hardness for the various cutting materials. Hardness is here presented in Brinell numbers since these can easily be translated into the other two common hardness designations, Rockwell and Sclerescope.

In fact, hardness is of such prime importance in the determination of

Table 5

Cast Cutting Materials Face Milling

B.H.N.	4" sim	dia. rpm	6" sim	dia.	8" sim	dia.	12" sfm	dia. rpm	18" sfm	dia.
325	55	55	55	36	55	27	55	18	55	12
	80	80	80	55	80	40	80	26	80	18
275	80	80	80	55	80	40	80	26	80	18
	116	116	116	77	116	58	116	38	116	27
250	110	110	110	77	110	55	110	36	110	25
	142	142	142	94	142	71	142	44	142	32
220	142	142	142	94	142	71	142	44	142	32
	155	155	155	103	155	77	155	53	155	35
180	155	155	155	103	155	77	155	52	155	35
	166	166	166	110	166	83	166	55	166	37
150	166	166	166	110	166	83	166	55	166	37
	200	200	200	135	200	100	200	66	200	44

Note that the cast cutting materials cannot mill components with a b.h.n over 325.

s.f.m. that we here and now suggest that in taking the first step towards properly setting up speeds and feeds for a milling operation the hardness of the workpiece be definitely determined. If this is not known from the specification and the blue print data the hardness determination should be made before the speed selection is undertaken.

There is little difference in fact between the so-called controlled cast irons such as Meehanite and the steels of the same hardness; thus, a controlled cast iron whose Brinell hardness is in the neighborhood of 200 has cutting characteristics very similar to that of steel of the same hardness specification. While this is only a general rule and will be amended shortly in this discussion it is safe to state that hardness of the workpiece is of prime importance in the proper selection of the s.f.m.

Table 8 presents all the necessary data showing the relationship between the s.f.m. and the Brinell hardness. Note that the rate at which a cutter can be revolved drops decidedly as the hardness increases. The reason for this is immediately obvious and yet the determination of the s.f.m. in terms of Brinell hardness is of prime importance in the tabulated form.

The second important factor in the metallurgical characteristic of the material to be machined is its heat treatment. This not only takes into consideration the hardness of the material but also its crystal structure. If a workpiece has been subjected to a normalizing temperature so that its crystal structure has been favorably affected the machineability is increased and hence the s.f.m. can be chosen on a higher level.

The third metallurgical characteristic is that of strength in the workpiece and is generally referred to in terms of tensile strength. While this frequently is directly related to the Brinell hardness it is also well to keep in mind that the greater the tensile strength, generally speaking, the greater will be the machining problem. The machineability of high tensile materials is, generally speaking, proportionately higher than that of the lower tensile materials.

Table 9 presents the s.f.m. determinations for special materials such as armor plate, Ny-Resist, stainless steels and other materials of a similar nature. These have special metallurgical characteristics and therefore present special machining problems. This is particularly true of armor plate and the stain-

Table 6 Carbon Tool Steel

B.H.N.	4" sim	dia.	6" sim	dia.	8" sim	dia.	12" sim	dia.	18" sim	dia.
275	20	20	20	13	20	10	30	6	20	4
	25	25	25	16	25	12	25	8	25	6
250	30	30	30	20	30	15	30	10	30	7
	40	40	40	26	40	20	40	13	40	9
220	40	40	40	26	40	20	40	13	40	9
	45	45	45	30	45	23	45	15	45	10
180	45	45	45	30	45	23	45	15	45	10
	50	50	50	35	50	25	50	17	50	12
150	50	50	50	35	50	25	50	17	50	12
	60	60	60	40	60	30	60	20	60	14

Note that the Carbon Tool Steels cannot be used to mill materials with a hardness over 275.

less steels so commonly used in present engineering manufacturing, particularly for war material.

5. Type and Condition of Machine

The fifth determining factor in the selection of s.f.m. is the condition and type of the machine.

A knee type milling machine, generally speaking, is more rigid than a vertical. There are fewer gears and bearings and hence the rigidity is greater.

A plain horizontal machine is more rigid and stable than a universal. The latter has one additional moving part.

A bed type machine in the milling field is more rigid and therefore to be preferred to either the horizontal or vertical knee type machines.

The greater the rigidity in the machine the higher the s.f.m. can be. The tables above in which s.f.m. have been presented give the norm. Thus, normal rigidity provides the starting point. If a solid bed type machine is available the s.f.m. can be increased by as much as 25%.

The age and condition of the machine obviously affects its running characteristics, particularly its rigidity. An old machine that is in good repair and adjustment is better than a new ma-

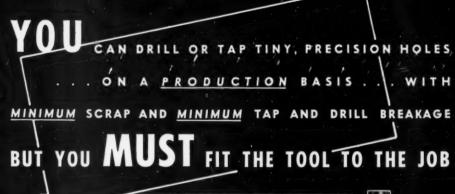
chine that has not been properly adjusted.

The amount of power available in the machine tool will very greatly influence the selection of s.f.m. If a heavily powered machine is available for a specific operation the s.f.m. can be higher than for a smaller powered machine. The greater rigidity in the former will justify a higher s.f.m. selection.

6. Workpiece Type and Condition

A solid workpiece without cavities and thin sections can obviously be milled at a much higher rate than a workpiece characterized by thin wall sections which will vibrate and set up damaging effects in the cutter.

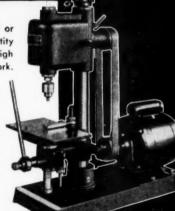
Of final importance is the repetitive nature of the job. If an operation is to be performed but once it is frequently justifiable to select an s.f.m. that will leave the cutter ready to be reconditioned after the single piece has been machined. It is frequently possible to use a cutter but once at such an s.f.m. that it is dulled in that one operation. In a highly repetitive operation the s.f.m. will be selected so as to give the maximum possible cutter life. This should frequently be based upon the number of pieces that can be machined in one eight hour shift without stopping



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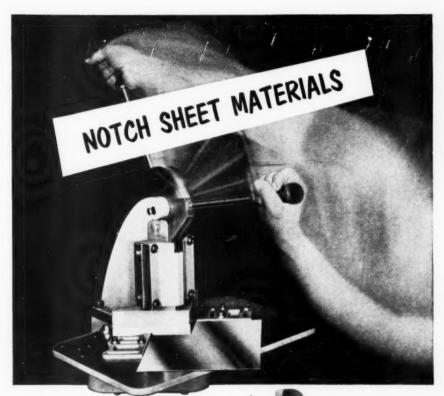
the machine to remove the cutter. Down time on a machine during a working shift is extremely costly. Hence the s.f.m. should be selected if a repetitive operation is performed such that the cutter need not be changed, if at all possible, until an eight hour period has elapsed. The smaller s.f.m. will be vastly offset by the decreased cost due to the absence of down time.

The selection of the proper s.f.m. is not a simple matter. It requires careful study and analysis of the job along with much background experience. It is not as involved as the discussion in this article would indicate and yet it does require that each job be given adequate consideration and study. The above discussion presents the important items in this consideration which will lead to the proper selection of the s.f.m.

The End







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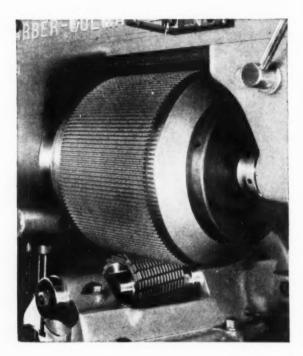


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On this job 2300 gears are cut per hob—about 195 pieces per sharpening. Low-cost unground Multithread hobs are used. Multithread design, with its increased indexing speed, has reduced total time to 1-1/2 minutes per gear. Fast loading and automatic hobbing cycle reduce operating costs to a minimum.

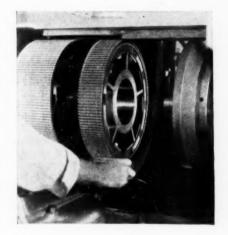




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HOBS AND MACHINES SINCE 1911

Variations in Die Strippers, Shedders and Punch Pad Designs

By Paul Prikos and Raymond Becker

Prikos & Becker Tool Company

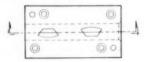
Skokie (Chicago), III.

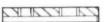
IT IS WELL for us in the die making field to give as much emphasis to strippers, shedders, and punch pad designs as we give to the design of die blocks and sections. In this article it would be impossible to examine every intricacy of their design, but we hope it might be helpful to review certain principles and highlight innovations which have proven successful.

DIE STRIPPERS — Every die having a stripper will have one that is either of the stationary or spring type construction. The function of a stripper is self explanatory, it simply separates the stock from the punches after the punch and die have engaged. The kind most commonly recognized is shown in figure 1. This is a stationary one, in some quarters referred to as the European style. Usually these strippers are made of cold roll steel, with a channel milled in the center to allow the stock to be guided and passed through the die. Sometimes, on longer run production jobs, hardened inserts are placed into

1. One-piece construction stripper.

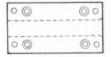


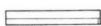


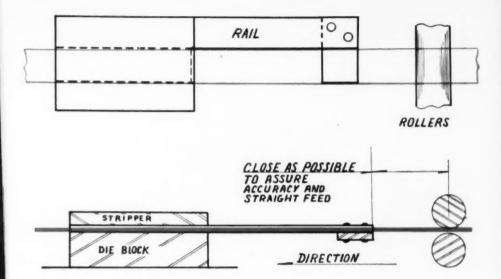


2. Three-piece construction stripper.









3. Automatic feed coil stock.

the rails to prevent excessive wear.

Another stripper in the stationary category, commonly known as the U.S. conventional, is of three piece construction. Such a design allows for removable rails, less chance for error in machining, and certainly makes for easy replacement in the event that a stock variation should occur. See figure 2.

In both types of strippers thus far described, we should mention that many times they will have a stripper rail that extends beyond the die set. The distance that it extends is determined by two things: (1) coil or strip stock to be run through the die and. (2) progression (pitch, multiple, etc.) of the stock in the die. In a strip stock operation the length of the strip guide must exceed the end of the die by a minimum of two and a half times the progression. Common practice has been to increase this amount wherever possible. However, in an automatic coil stock setup, greater importance is placed on the length of the strip guide. In addition, it is advisable to keep on the same plane with the die face and the center of the automatic feeders (ex. roll feed). See figure 3.

In some companies the specifications of the press room and the safety department require that a lid be placed on the extended stock guides. Their reasoning being for safety in operation and to prevent the stock from buckling. A few of these designs are exemplified by the sketches in figure 4.

We have found that in storing dies that have long extended stock guides, a small detachable arrangement can help eliminate this cumbersome condition. If we were to mount a small block with the attached stock guide at the end of the die block with dowel pins and screws, the whole unit could be removed and stored separately. The dowels would then press fit in the removable block and slip fit into the die shoe. Obviously care should be taken

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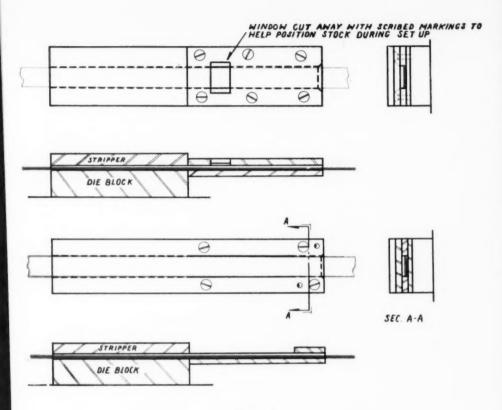


Figure 4.

in properly marking the stock guide so that it will not be misplaced.

A vastly different type of stripper is the spring stripper. It is usually incorporated in a die design that will perform a drawing, extruding, or forming operation. Sometimes in a cutoff die where we desire the material (stock) to hold in place while a cutoff punch severs the part, a spring stripper is imperative. And we know that a compound die always has a spring stripper. Although the term spring stripper is used in a general sense, it is commonly understood that a substitute resilient rubber for the springs would have the same use and application. Typical of

the importance of spring stripper applications can best be explained by a careful study of the sketches in figure 5.

Whenever an occasion arises where it is debatable whether one should use a spring or stationary stripper, use the latter. The reasons are: (1) a spring stripper is more costly and difficult to assemble and, (2) it is also subject to greater distortion when large openings are required in the stripper block.

SHEDDERS AND PADS—Both shedders and pads are virtually the same; the former being located in the upper member of the die, the latter being located in the lower half of the die. The real purpose of the shedder or pad

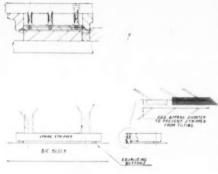


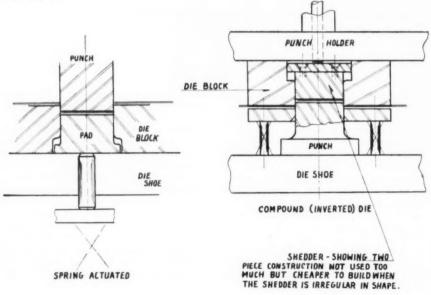
Figure 5.

is to support a forming or cutting operation in the stock as it advances through the die. After the operation is completed in the station which has the shedder built in, the section of material worked on is then ejected or returned into the strip—whatever the case may be. In thin material these mechanical devices are a great aid in preventing fracturing, wrinkling, and dishing. See figure 6.

The material used in the construction of shedders and pads need not be better than an ordinary oil hardening tool steel. Heat treat and harden only to a point where it will not tend to crack due to the intermittent jarring which occurs in actual operation. A Rockwell range in the middle 50's on the C scale is suggested. After one grasps the real significance and use of shedder and pad variations, they will not pose much of a problem. For example, a split shedder which may be very irregular in design is the accepted practice as it helps speed up construction. This may

Figure 6.

Note: The shedder should be approximately .010—.015 below die block surface (face) in the open position. Also spring pins are advisable to make certain the piece part will drop off.





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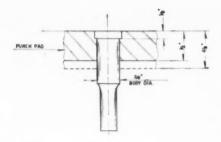
Brief Specifications of Logan 12" Lathes
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35"... Turret Lathe Models have 43" bed length... 13/a" spindle hole
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7. Typical punch and pad construction.

be either dovetailed, or doweled and screwed together.

We should realize too, that the walls of shedders and pads should always be perpendicular and that they are a slip fit. There need not be a 100% bearing surface all around, but enough land should be had to prevent any cocking action while the die is producing parts during a production run. Another design feature to remember is to have the heels or shoulders made with clearance so they will never bear, but will act to prevent the shedder or pad from falling out.

PUNCH PAD — Any die other than cheap class "C" type with limited production, should be given consideration as to whether it is best to use a cold roll steel or soft tool steel punch pad. We believe the latter will reap sufficient rewards and, therefore, use it wherever possible. Any thorough investigation into die maintenance costs will show how a good sturdy punch pad will avoid costly punch chipping; and loosening of punch, perf, and pilot locations.

When we consider that so many of our perfs and pilots are in the popular 1/4, 3/4 and 1/2 in. body diameters, why use punch pads that are only 1/2 in. thick and made of cold roll steel? When die space permits, use a minimum of 5/4 in. thick punch pad. Today many

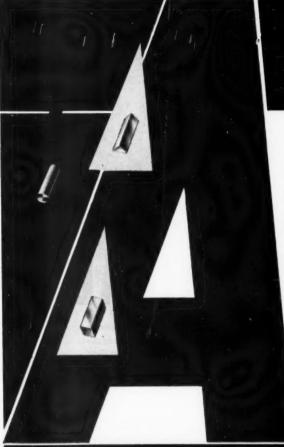
commercially made perfs as well as those made in toolrooms have shoulder thickness of 1/16 to 1/8 in, thick making their bearing areas in thin punch pads even niore risky. When we combine the adverse conditions of approximately % in, long bearing surface and a thin cold roll steel punch pad, which is subject to warpage and distortion, one cannot help but realize why there is deflection of punches with additional possibility of chipping and excessive wear. See figure 7. A solid heavier punch pad made of soft tool steel will avoid this trouble and is superior in design and construction.

Advancing a step further, we will find some dies with hardened punch pads. Here extreme precision is required by employing jig boring and, after heat treat, additional jig grinding. This method is used quite frequently in very costly sectional progressive dies. The purpose of such a design is to assure greater accuracy and longer life to the punch pad construction.

The End



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Brazing of Cemented Carbide Tools and Parts

IN SPITE of the fact that the brazing of metallic materials is a technique that has been known and practised for hundreds of years, there are still many questions asked of the Kennametal personnel, both in the factory and in the field, as to the proper methods to be used in the successful brazing of cemented carbide tips to steel shanks.

Visitors to the plant at Latrobe, Pennsylvania, are invariably interested in obtaining information on two of our operations: that of brazing and grinding of Kennametal tools and wear parts.

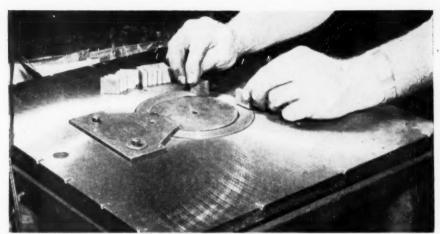
In regard to brazing, a big percentage of the questions raised centers around the cleaning of the tips and shanks in preparing them for the brazing operation. Immediately following the sintering operation, most of our tips are ground on a vertical type tip grinder, figure 1. This is a free hand grinding operation to remove any material that has been picked up from the graphite trays while in the sintering heat. The grinder is a special unit designed and built by Kennametal. The spindle is set in a vertical position with the wheel

by **F. J. Lennon, Jr.**General Superintendent
Kennametal, Inc.
Latrobe, Penna.

face in the same plane as the working table. The operation is very fast and consists of passing the blanks over the wheel face of a metal bond diamond wheel. The blanks are set on the table and are merely moved across the wheel face and cleaned by the grinding action of the wheel.

Following this preliminary grinding operation, the blanks are carefully sandblasted in a dry type sandblasting machine. From our experience, we have found that a sandblast operation is the most effective way of cleaning blanks.

Just before brazing, the blanks are washed in plain water to remove any sand or dust that might have been re-



1. Cleaning operations showing edges of carbide blanks being cleaned on vertical type tip grinder. Wheel used is a metal bonded diamond wheel.

tained from the sandblast. The blanks are left immersed in the water until they are ready to be used. At that time the operator will place the blanks in a pan of flux that has been thinned out to a wet paste consistency.

There are many who advocate the use of carbon tetrachloride for cleaning prior to brazing. We have no quarrel with this method and, when properly done, it is an effective method of cleaning. However, for our own work, we find the sandblast method to be the most satisfactory. In using carbon tetrachloride, one precaution must be observed. When cleaning tips to remove oil or grease, the carbon tetrachloride will do this effectively; however, the grease will form a film on the top of the carbon tetrachloride and when the blank is removed from the cleaning bath, the oil or grease film will deposit on the blank and may result in brazing difficulties. Attention must be given to changing the cleaning solution frequently to eliminate this possibility.

In preparing a steel shank for braz-

ing, we simply remove all burrs from the edges of the tip recess, brush the recess with a dry brush, and then apply the flux. No special cleaning operations are found to be necessary in the shank itself other than those indicated above. However, this procedure may only be applicable as long as the flux that we refer to is used. Any change in flux might require additional cleaning of the shanks. From all of our experiences resulting from bad brazes, we rarely ever find that the bad braze is due to insufficient tinning of the steel surface. When we find a bad braze, it is generally because the braze material has not bonded to the carbide itself. For this reason, particular attention must be given to proper preparation and cleaning of the carbide blanks.

The assembly of the blank and the braze material to the shank is done as follows:

- Shank deburred, brushed clean, and fluxed.
 - (2) Brazing material placed in recess.
 - (3) The blank which has been kept



2. Torch brazing operation.

in the container of flux, as pointed out above, is removed and placed in recess.

Brazing, of course, can be carried out in any one of several ways, such as high frequency induction brazing, furnace heating, torch brazing, etc. Most companies, in considering facilities for brazing, are first interested in the possibility of using high frequency induction equipment. Many times we have had the question put to us as to what type of high frequency equipment we would recommend to them. For obvious reasons we prefer not to get involved in making specific equipment recommendations. In the first place, a great deal depends on what type and variety of work they plan to do. Our spark gap type of equipment, made by Lepel. has a great deal of flexibility, and will handle a wide variety of brazing operations.

In gaining this flexibility other things are encountered. The maintenance cost of a spark gap unit is quite high. Spark gap units are potential sources of television interference-more so than tube sets and motor generator units. Where a limited variety of work is to be done or a specific job is required, then tube sets or one of the motor generator types of unit may be better suited. The Tocco machine is probably the best known motor generator type of machine. Tube sets are built by Induction Heating Corporation, Westinghouse, R.C.A., Lindberg, and many others. At Latrobe we have used all three types and believe that there is a definite place in the field of brazing for all of them. We do feel that high frequency brazing is more efficient than furnace or torch brazing in the manufacturing of Kennametal tools and for this reason a very high percentage of our brazing is done by this method.

Our production brazing falls into two categories; namely, low temperature brazing, and high temperature brazing. By low temperature brazing, we refer to the use of a brazing material such as Handy & Harman's Easy-Flo No. 3. which has a melting point of 1175°F and a flow point of 1250°F. For this type of brazing we use a flux made by the Special Chemical Company. The specific flux for this application is known as Kwik Flux No. 54. Again, we hesitate to be specific in our recommendations; however ve have found in our own operations that this particular flux is better for our work than anything that we have yet tested. There may be other fluxes on the market that are equally as good that we have not yet tested.

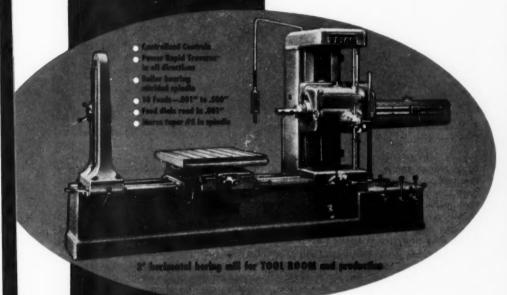
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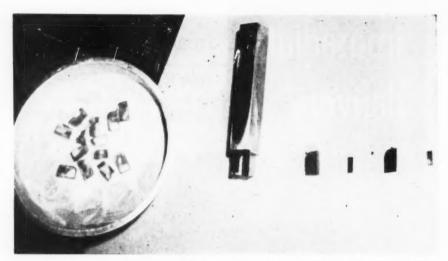
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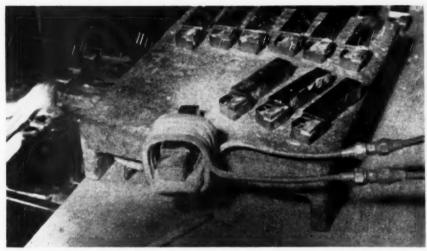
3. Materials used in making sandwich braze. View shows the shank, tip, layer of Easy-Flo, copper shim, and layer of Easy-Flo.

temperature range, it is removed from the coil and the tip is moved in the recess, wiping the braze material over the entire recess surface, and then applying pressure to the top of the tip to squeeze out any excess brazing material. The pressure is applied until the braze freezes. This technique will result in a thin, strong braze and one that will stand up under the most severe cutting conditions. The thickness of the braze should be somewhere between .002" and .005" for best joint strength.

For high temperature brazing, we use Tobin Bronze No. 481. This material melts at 1625°F and the braze temperature is set at 1750°F. For this type of brazing, the flux must be changed to one that provides proper protection at the higher temperatures. In our own operations, we mix thoroughly one part of Kwik Flux No. 54 to two parts of borax. It is important that these be mixed well for proper results. Water is used to obtain the desired consistency. Where high frequency equipment is

used for this type of brazing, the technique is the same as outlined above for low temperature brazing. When low temperature torch brazing is done, Easy-Flo No. 3 and Kwik Flux No. 54 are used. The tool is held in a vise at the rear of the shank with the tool inclined at a slight angle—the tip end being higher, figure 2. Heat is applied on the bottom of the shank and radiates up through the shank and tip. When the braze material flows, the torch is removed and the tip moved and pressed in place much the same as outlined above.

For high temperature torch brazing, the technique is modified somewhat. The shank is held in a vise and fluxed with the mixture of Kwik Flux No. 54 and borax. Heat is applied to the shank only until the flux flows freely in the recess. The Tobin Bronze No. 481 is applied to the recess, tinning the surface well. The tip which has been fluxed is then set in the recess while the shank is still hot. The torch is



4. Shows carbide tool being heated in high frequency induction coil.

again applied until the flux flows freely and the brazing material is again melted. The tip is then pressed into place.

All torch brazing should be done with a reducing flame to prevent oxidation of the shank steel. Care must be used to make sure that both the steel and carbide are heated sufficiently to allow proper bonding of the braze. If the shank is sufficiently hot while the tip is too cold, the brazing material will adhere only to the steel and the carbide surface will have no bond to the shank, and an early braze failure will result. The results will be equally bad if the carbide is hot while the steel is too cold. This unequal heating is most frequently encountered in torch brazing operation.

In some rare instances, even higher brazing bonds are necessary and when this is required copper brazing is used. For best results this type of brazing should be done in suitable furnaces. We would recommend the following procedure for copper brazing of carbide tools:

Flux the tool recess with dry borax and place in a preheat furnace, operating at 1700°F. When the tool is up to furnace temperature, remove the shank and scrape the flux from the recess. Place the copper brazing material in the recess and insert the carbide blank. Flux the tool and blank well with dry borax and place in a high temperature furnace, operating at 2150°F to 2200°F, and use a good reducing atmosphere.

When the tool is up to temperature, the copper will readily flow around the tip and tool recess. Remove the tool from the furnace and press the tip in place. Overheating of the tool or using an oxidizing atmosphere will seriously affect the quality of the brazed joint.

In specifying copper brazing for a given tool, too often the steel specification is overlooked. In using regular shank steel material for a copper brazed tool, the very high temperature that is necessary for the brazing results in grain growth, which reduces considerably the impact strength of the steel.



5. High frequency induction brazing machine using dual coil setup. While one coil is heating tool, other coil is being unloaded and loaded. Machine automatically switches current from one coil to the other in a predetermined time cycle.

If copper brazing is necessary, then a suitable shank steel should be selected, one that will not be subject to excessive grain growth at the elevated temperatures. An alloy steel containing molybdenum, or chromium, or nickel, or a combination of all three will generally prove satisfactory. Manufacturers of tool steels should be referred to for their specific recommendations. Copper brazing with a torch is not recommended due to the lack of control of the temperature and the surrounding atmosphere. Uniform quality brazes are not easily obtained by the torch method when copper brazing is required. Due to the need for special equipment, most shops are not able to do a satisfactory job of copper brazing. Investigation will often indicate that high temperature brazing with Tobin Bronze No. 481, or equivalent, will prove satisfactory for the operating conditions. Since the latter method is much simpler, it should be used wherever possible.

To minimize brazing strains, we frequently use a copper sandwich braze. For this purpose we use a triclad brazing material made by the Handy & Harman Company. It consists of a .005"

copper shim bonded on both faces with a layer of Easy-Flo No. 3 that is .0025" thick. The copper shim remains malleable at the low temperature used to melt the Easy-Flo No. 3, and acts as a cushion to relieve the brazing strains.

Where the triclad material is not available, satisfactory results can be achieved by applying the copper and Easy-Flo No. 3 in separate pieces—that is, a .005" shim of Easy-Flo No. 3, a .005" shim of copper, and another .005" shim of Easy-Flo No. 3 are successively placed in the tip recess, figure 3.

Our standard practice in regard to sandwich brazing is as follows:

All tools with tip grades K6, K8, or K3H are sandwich brazed unless the tool shank is less than 1/4" in width.

All tools with shank dimensions 1" square or larger are sandwich brazed in all grades of Kennametal.

One of the more difficult brazing problems arises when the customer requests that a heat treating condition in the shank be maintained along with the brazed joint. If the two operations are done simultaneously—that is, heating the shank all over to brazing tem-



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perature and oil quenching — little control is possible in obtaining specific hardness ranges in the shank. If the shank is first heat treated to proper hardness, followed by the brazing operation, some softening takes place in the tip end of the shank resulting in a non-uniform hardness condition.

Where such specifications are necessary, the shank material should be specified as one of the air hardening types. Then the shank is hardened to prescribed specifications and brazing is done as a separate operation. Reheating the tip end of a shank made from air hardening steel will not seriously affect its hardness.

There is actually little mystery involved in obtaining good brazes, provided the simple rules outlined above are known and followed. Cleanliness of the tip and shank are of utmost importance and no brazing should be attempted until proper cleaning preparations are made. Variations in the flux, brazing materials, and methods outlined

above can be made and good brazes obtained. However, there can be no compromise on the proper cleaning of the tips and shanks.

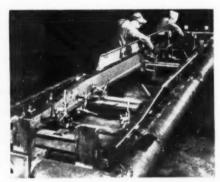
The End



Toggle clamps build-up towing tractor frame on rotating fixture

Federal Motor Truck Division of the Federal Fawick Corp., Detroit, Mich., uses De-Sta-Co toggle clamps during the build-up operation on airplane towing tractors for the army. The Model TT11 tractors are used extensively at airports and are manufactured on a trunnion rotating frame fixture which turns at 360° to permit easy access for the workmen. Clamps are made by Detroit Stamping Co., 350 Midland Ave., Detroit 3, Mich.

The De-Sta-Co toggle clamps permit positive holding pressure of parts during the build-up operation. In the manufacturing of the tractors special holding blocks were welded to the adjusting bolt of the clamps to aid gripping area on the channel iron. The heavy frame



rails, welded brackets and channel iron are lowered into place on the fixture via an overhead crane, and clamped into position for the welding and riveting operations. The Model TT11 airplane towing tractor has a load capacity of 24 tons.





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DEFENSE

Boring Large Tapers on Small Lathes

By Tom Brown, Consulting Tool Engineer

A SMALL contract machining firm had to taper bore a quantity of light alloy castings whose cross-section is shown at A in the sketch. The included angle of the taper varied by about 10 degrees from one batch to another, the maximum taper required being shown in the component A. In all cases, the length of the tapered side was about 6 or 61/2 ins. and the angle of the side with the center line of the bore in the component having the greatest amount of taper was 19 degrees. After taper boring, the outer flange had to be faced and its perimeter machined so that all these surfaces were running concentrically with one another.

It was decided to machine these castings on a 12 inch engine lathe worked by a young apprentice. By so doing, the labor costs and overhead costs would be low, although the rate of output would not be particularly high. Delivery time for castings fitted in with the rate of output anticipated, so it was decided to go ahead with this plan for machining the parts.

At first glance, an obvious attachment for the lathe on which these castings were to be machined would be the standard taper turning slide. However, it was found that the standard taper turning attachment for this lathe had only 5 inches of tool travel; furthermore, the largest included angle which could be bored when using it was 20 degrees. The castings required a maximum of 38 degrees.

A further weakness of the standard attachment for taper turning was that the change-over from taper to straight turning involved an elaborate process of connecting up the cross slide screw with the cross slide. In order to overcome these troubles, a new taper boring attachment was designed and made up.

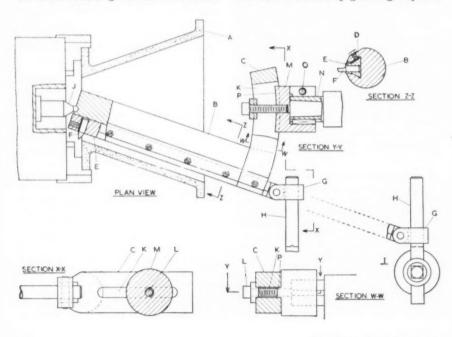
The attachment is shown in the sketch and has the advantage that it can be mounted or removed from the lathe quickly and without disturbing the normal turning facilities of the machine. It has a certain range of adjustment for turning various taper angles and utilizes the range of longitudinal power feeds for traversing the cutting tool through the component bore.

Main part of the taper turning device is the tool bar B which is a length of 2 inch diameter mild steel to one end of which is welded the quadrant bracket C. A dovetail slot runs longitudinally in the tool bar (see section Z-Z) and this is provided with an adjustable gib strip D for the taking up of slack between the dovetail slot and the tool slide E fitting therein.

At the left hand end of the tool slide is the tipped cutting tool **F** which is of circular body section and is held in place in a hole drilled across the slide by means of one headless setscrew. The outer end of the tool slide, on the right, carries a swiveling link **G** which has a hole drilled transversely to take the push rod **H** which can be clamped in the normal lathe tool post.

From the description thus far, it will be apparent that longitudinal traversing of the lathe tool post will cause the dovetail section tool slide to travel through the tool bar and since the tool bar is set at an angle to the lathe center line, a taper bore will be generated in the revolving work. The position of the link G upon the push rod H at the start of the tool's traverse along the bore is shown at I. It will be apparent that the link must slide transversely along the push rod as the tool post travels in a leftward direction. By making the swiveling joint and the sliding fit between the hole in the link and the push rod with minimum clearance, a lot of the downward thrust on the cutting tool is opposed by the support of the tool post.

The tendency for the revolving work to push down upon the tool bar and try to carry it around is resisted in another way, additional to the resistance offered by the tool post. The left hand end of the bar is supported upon a standard pattern revolving center J of the small outside diameter type, fitted with needle bearings. The center has been modified by grinding a sphere





Photos courtesy of The Dumore Company,



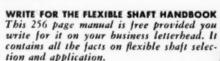
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These are only a few of the flexible shaft pointers a flexible shaft tool designer could give you. There are many more all of which add up to improved design and lower costs. The simplest way to find out about them is to . . .





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or ball end upon it, in place of the standard point. This sphere mates with a spherical recess machined in the end of the tool bar. One advantage of using the revolving center is that no torque is transmitted to the tool bar when the lathe chuck is revolving, and another advantage is that fairly firm end pressure can be applied to the tool bar to keep the male and female spheres in engagement with one another. The spherical tip on the revolving center allows maximum supporting area for the tool bar while allowing the tool bar angle with the lathe center line to be adjusted without detriment to the smooth running of the assembly.

The main support against rotation of the taper turning device is given by the quadrant bracket C at the right hand end of the tool bar. The arc machined on the vertical end face of the quadrant bracket has its radius originating at the center of the sphere on the end of the revolving center. Sections W-W and X-X illustrate the various parts of the quadrant bracket and show that a blind-ended slot K is machined transversely through it. The slot serves the dual purpose of forming a sliding keyway and an aperture for the bolt L which clamps the quadrant bracket to the support block M.

Block M is bored to engage with the outside diameter of the lathe tailstock barrel N on to which it may be clamped securely by means of the saw cut down one side, which is nipped together by the bolt O. The longitudinal keyway in the tailstock barrel is engaged with a short key fitted into the bore of the support block. End thrust of the lathe tailstock barrel is taken by the flat bottom of the bore in the support block and is transmitted to the left-hand end of the tool bar to hold the spherical seating in tight engagement.

Engagement of the support block with the quadrant bracket is by means of the transversely machined tongue P across the end. The tongue is a close

sliding fit within the slot in the quadrant bracket and thus takes most of the turning moment on the attachment caused by the action of the cutting tool. The mating vertical face on the end of the support block is machined to an arc whose radius corresponds to that of the quadrant bracket so that the angle generated by the attachment can be adjusted easily by merely loosening the bolt L.

As drawn, the attachment is set up for roughing cuts; one cut being sufficient to remove the scale from the cast bore. A four-jaw independent chuck enables the rough castings to be set up truly. After roughing, each casting is set up in a three-jaw self-centering chuck for the final finishing cut which is also done by means of the attachment, but with a finishing tool readjusted for final size, in place on the tool slide.

Between operations, the attachment can be removed easily by releasing the push rod from the tool post and unclamping the tailstock so that it can be slid up to the tail end of the lathe, carrying the attachment with it.

One final point about the design. It might appear that the tool slide is of very light cross-section for the work it is called upon to do but the extremely long support offered to it by the dovetail slot running the full length of the tool bar stiffens it adequately. It will also be noted that the tool post must be traversed a good way to the right of the tailstock for the cutting tool to be in position for starting a cut at the mouth of the taper bore. This is achieved by swiveling around the lathe top slide in line with the lathe center line and then cranking the slide as far to the right as it will go. The tailstock body is then adjusted for position on the bed so that the barrel is projecting from it by the minimum amount so that maximum rigidity of support is given to the quadrant end of the attachment. The End

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COMPANY

CITY_____STATE__

THE BIG HYDRATROL STORY:

16 Spindle Speeds

with only a

with only a

WiST of the Wrist

with This Automatic Slide Rule Selection



Just a turn of the hand wheel on the front of the headstack of the LEHMANN Hydratrol Lathe gives you a speed changel An automatic slide rule, co-ordinated with the movement of the handle, shows spindle revolutions per minute and indicates a slide rule calculation of the cutting speeds in feet per minute.

Calculation by the operator is unnecessary. The speed change handle is moved so that diameter of work within the range of the lathe registers with specified cutting speed in feet per minute, and the lathe automatically makes the necessary change.

The rotary selector gives 16 forward and 8 reverse speeds. No need for intermediate stop; unnecessary to disengage the friction driving clutch to change speed.

Check These Other Important Advantages:

- Safe in operation.
- Simplicity in construction and operation.
- Hydraulic friction clutches and hydraulic brakes, self-compensating.
- Automatic safety relay, for harmless and easy engagement of positive clutches when speeds are changed.
- Spindle release for chucking.
- Perfect, safety-control lubrication with filtered oil.
- Gears constantly in mesh.

Write today for additional information or catalog—or—send prints for timeand-money-saving recommendation!

LEHMANN MACHINE COMPANY

GRAND et CHOUTEAU . ST. LOUIS 3, MO.

DIVISION OF NOVO ENGINE CO.



DUMORE tool post grinders

add productive capacity

to your present machine tools



A Dumore Tool Post Grinder provided the only practical solution for this unusual problem. Mounted on a vertical boring mill, it halved production time for grinding the perforated, tapered surface of 43" cast iron strainer cores.

Mount this Dumore grinder on any machine and you'll get a more versatile tool. One that will not only machine the workpiece, but finish grind without changing setup. What's more, it delivers precision work to .0001" accuracy.

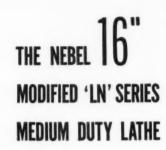
Production men say the Dumore grinder is the busiest tool in the shop. They like the high-quality work it turns out. It's ideal, too, for tool room and maintenance use.

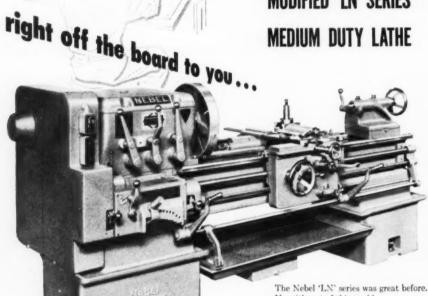
Dumore Tool Post Grinders offer a broad potential for reducing labor and handling costs . . . increasing machine capacity.

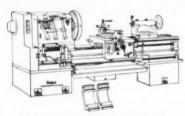
Ask your industrial distributor for a demonstration, or write



The Dumore Company







Wide, deep gap presents additional swing capacity , . . has all the advantages of the 16" Modified 'LN' engine lathe.

The Nebel 'LN' series was great before. Now it's out of this world. Really, it's the newest lathe on the market. It's hot off the board ... ready for you now!

With 10 new design, construction and operation features, you'll agree it's the finest 16" lathe in its price class.

Also available in Nebel's famous doubleduty removable block gap model. For complete information, write The Nebel Machine Tool Co., Cincinnati 25. Ohio.





HORIZONTAL MILLING MACHINE

Spindle of nickel steel, hardened and ground externally and internally, and fitted with pre-loaded ball bearings. Speeds, 85 to 2750 R. P. M. with Variable Speed Drive, directly reversible. Table, 41/8" x 18" with longitudinal travel 12"; transverse, 6", vertical, 6". Two-speed motor, 3/4-3/8 H.P.

TOOL ROOM PRECISION WITH PRODUCTION SPEED

. . . that's what you expect and get from Elgin Machine Tools. They are designed and built to tool room standards. to perform to close tool room tolerances . . . and with sturdiness permitting speed that fits right into production lines.

Elgin Lathes and Milling Machines are standard equipment in many tool rooms and shops where extreme accuracy is necessary.

VERTICAL MILLING MACHINE

Spindle is nickel steel, hardened and ground both externally and internally, and fitted with pre-loaded ball bearings. Five speeds, 200, 700, 1250, 2250 and 4000 R. P. M. Vertical travel of spindle, 13/4". Table is 41/8" x 18" with 12" longitudinal travel; transverse travel 6". Vertical table travel 7". Head swivels 90° each side of center.



CHICAGO 13, ILLINOIS 72 BERTEAU AVENUE

New Principle Reduces Tooling Needed for Machine Operations

THE MULTIVERSAL PRINCIPLE of machining, which has as its backbone the Multiversal machine, means combining all operations on one part and performing them on one machine with one operator, and with one setup whenever possible. The thought behind the principle is that it is easier and more economical to perform all operations on one machine than to move the part from one machine to another and use a number of operations.

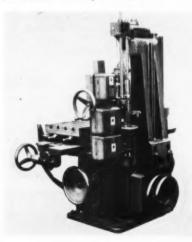
The Multiversal machine performs the following operations, as well as others not listed here: plain contour, multiple spindle, spiral, vertical and horizontal milling; jig, horizontal and production boring; single or multiple duplicating; vertical or angular slotting; key seating; and broaching.

Power source for all rotary functions for the Multiversal machine is the master head, both high speed or backgeared. Horizontal and vertical milling heads, arbors, and cutters are attached to it, and standard auxiliary heads and other attachments may be fitted to it also. Without disturbing the setup of the piece, and while work is in progress, it is possible:

 to make any permanent arrangement of the heads which will complete a series of operations by swinging, or otherwise adjusting the heads;

—to make any multiple setup of the heads, permitting a sequence of operations to be performed with one pass of the work under the heads:

1. No. 10 Multiversal machine illustrating the balanced design feature.

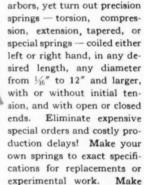


TWO PRECISION, TIME-SAVING, LABOR-SAVING TOOLS





Then you need a replacement or experimental bring, any shape, diameter or pitch from flat or ound wire sizes .005" to .125", you can produce it a matter of seconds with the new Perkins Precision pring Coiler! You entirely eliminate the use of



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WEST SPRINGFIELD, MASS.



Power model for continuous runs. on welded steel console base.

CLUSIVE DISTRIBUTORS OF **Connors and Davis** DOLS Sales Corporation



Hold Any Machine Work Vithout Arbors, FAST With At Any EXACT Angle With **Omniversal Precision Vise!**



Accurately set in all three planes in only 15 seconds, this sturdy precision vise made in two capacities saves time and headaches for progressive shop operators and pays for itself quickly. Only

7" high (lowest in the trade), Omniversal #4, shown at top, is tough, weighs 74 lbs. Jaws are 4" x 11/2", open to 4". Base is 9" in diameter with one side straight. Inset shows Omniversal #2, a precision low-priced vise. Users find it exceptional for grinding compound angles on carbide tools. Weight, 16 lbs. Height, 43/4". Jaws, 21/8". Opening, 21/8". Base, 71/4" x 5". For grinding, drilling or general work at any angle, by hand or machine, an Omniversal Vise is the machinist's choice.

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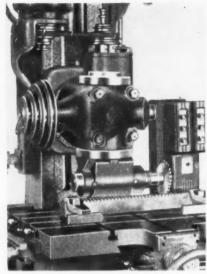
	4
Name	Title
Company	
Address	
City	State



2. Vertical milling.

- —to add attachments, while work is in progress, to combine the slotting motion with the rotary cutting equipment:
- —to make a permanent multiple setup of the heads which will permit one to four identical parts to be machined at the same time;
- —to make any multiple setup of heads, permitting a series of identical operations to be performed on identical pieces, by using the reciprocating feature, either power or hand operated. It is claimed that the full utilization

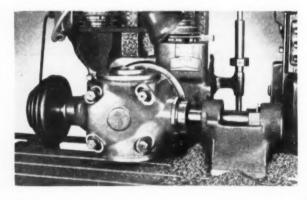
of the Multiversal Principle will result in: minimizing the number of idle machines in the shop, cut fixtures and operators; reducing floor-to-floor time and eliminate unnecessary handling of



3. Horizontal milling.

materials, thereby assuring greater accuracy between related surfaces and bored holes.

The reciprocating ram, or column, makes possible a vertical movement as in a vertical shaper, and may be used for slotting purposes under power. Inasmuch as this movement may be hand-controlled it has many other machining applications. Rapid vertical adjust-



4. Horizontal boring.



CIMCOOL LOWERS COSTS and does a better job!

Plant after plant reports that this radically new and different cutting fluid—this chemical emulsion—does a better job, while saving money three important ways:

- CIMCOOL° INCREASES TOOL LIFE
 (and thus reduces down time) because of
 ts chemical lubricity.
- FASTER SPEEDS are possible because Cimcool cools faster, through a unique physical change in the cutting fluid itself. Tools and thips actually stay cool to the touch.
- CIMCOOL COSTS LESS than old-fashioned cutting fluids because it lasts longer. It also cuts labor costs for cleaning and changing. It

virtually eliminates rancidity and foul odors. And there is practically no carry off.

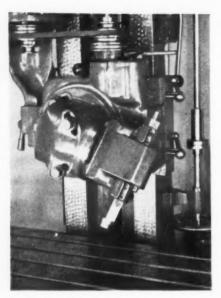
For a demonstration, write us and we'll have one of our Cincinnati Milling-trained machinists call on you—without cost or obligation. Or, if you prefer, write for our free booklet, "Cimcool Defeats Heat." Address, Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

°Trade Mark Reg. U.S. Pat. Off,

CIMCOOL

6 85% ovall metal writing jobs

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.



5. Angular slotting.

ment in step milling is possible when using gage blocks in connection with a micrometer stop. The ram is spring counterbalanced to minimize power consumption and permits finger-tip sensitivity and control.

The vertical head may be put in place in less than four minutes and can be used for either boring or heavy milling. Auxiliary heads are attached almost instantly to either face of this vertical head when multiple milling operations or combination sequences are desired.

The filing head and elevated table should prove of interest to the tool and die maker. The head slots out die openings and cavities, at any angle or combination of angles, will file any clearance or shape on irregular punches dies or hobs; and lap or hone the piece after hardening. It also serves as a small broaching unit.

The economy most noticeable in doing

heavy work is the elimination of time spent in transferring work from one machine to another. Here sequence machining pays off in a big way. Relatively large jobs are handled with ease, and operations such as plain milling, vertical milling, slotting, boring, drilling and angular milling are done on one machine, in but two or three settings, and with the required accuracy.

Since Multiversals are capable of handling pieces weighing a fraction of an ounce to castings weighing one ton or more, their use in maintenance work is rapidly growing.

Five models of Multiversal Machines, built by the Hack Multiversal Machine Company, Des Plaines, Illinois, are available. The No. 10 has a table travel of 14"x36", No. 20 has a table travel of 16"x60", No. 50, just off the board, has a table travel of 60" longitudinally, 18" transversely, and a vertical movement exceeding 20". Multiple column machines with two or three columns are the Duplex and Triplex models.

The End.

Mechanics Through the Ages

A collection of 63 of the more popular mechanics cartoons published in the MACHINE and TOOL BLUE BOOK over the past few years. Bound in a hard-cover it withstands constant wear. Cartoons are instructive, entertaining and make worthwhile reference tools. Available from Hitchcock Publishing Co., 222 E. Willow Ave., Wheaton, III. Price: One dollar.

BLUE BOOK'S Know How Reference Sheets

Surface Cutting Speeds for Various Grades of Cold Drawn Steel on Automatic Screw Machines

Speeds given below are approximate and are to be used only as a basis from which proper speeds for the part may be calculated. The figures represent the averages for the general run of parts made from cold drawn steel. Any extraordinary features in the part to be made should be taken into consideration and speeds altered accordingly. (Grades not listed may be interpolated from the speed and feed values of the listed grades most similar in chemistry.)

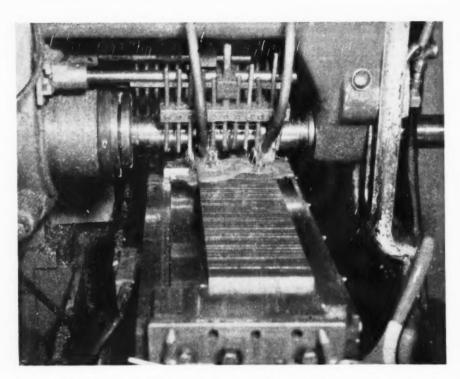
FREE CUTTING STEELS

	A.I.S.1. No.	S.A.E. No.	Surface Feet Per Minute	% Relative Speed Based on A.1.S.1. B1112 (S.A.E. 1112) as 190%	A.I.S.I. No.	S.A.E. No.	Surface Feet Per Minute	% Relative Speed Based on A.I.S.I. B1112 (S.A.E. 1112) as 180%
	81111	1111	155	94	C1137	1137	120	72
	B1112	1112	165	100	C1138	1138	125	76
	B1113	1113	225	130	C1140	1140	120	72
	C1108		135	81	C1141	1141	115	70
	C1109	-	135	81	C1141*	_	135	81
	C1113	-	165	100	C1144	_	125	76
	CIIIS	1115	135	81	C1144*	-	140	85
	C1116	_	155	94	C1145	1145	110	66
	C1117	1117	150	91	C1145*	1145	130	78
	C1118	1118	150	91	C1146	1146	115	70
	C1119	1119	165	100	C1151	1151	115	70
	C1120	-	135	81	C1151*	1151	135	81
	C1125	1125	135	81	1			
				CARBON	STEELS			
	C1008	1008	110	64	I C1043	_	105	64
	C1010	1010	120	-	C1045	1845	95	57
	C1012**	-	120	-	C1045*	1045	120	72
	C1015	1015	120	72	C1050	1050	90	54
	C1016	1016	130	78	C1050°	1050	115	70
	C1017	1017	120	72	C1055*	1055	85	51
	C1019	_	130	78	C1060*	1060	85	51
	C1020	1020	120	72	C1065*	1065	80	49
	C1022	1022	130	78	C1970°	1070	80	49
	C1023	_	125	76	C1078*	1078	75	45
	C1025	1025	120	72	C1080°	1080	70	42
	C1030	1030	115	70	C1085*	1085	70	42
	C1035	1035	115	76	C1095°	1095	70	42
	C1040	1040	105	64	B1010	-	130	78
				ALLOY	STEELS			
	1320	1320	95	57	2515*	2515	85	81
	1330°	-	100	60	E2517°	-	85	51
	1335*	_	100	60	3115	3115	110	66
	1340*	_	95	57	3120	3120	110	66
	2317	2317	110	66	3130	3130	95	57
	2330	2330	90	54	3130°	3130	120	72
	2330°	2330	115	70	3135	3135	90	54
	2335	_	85	51	3135*	3135	115	70
1	2335°	-	115	70	3140	3140	70	42
	2340°	2340	95	57	3140*	3140	110	66
	2345°	2345	85	51	3141	3141	65	46
	E2512*	-	85	51	3141*	3141	105	64

^{*}annealed

Courtesy: Republic Steel Corp. Union Drawn Steel Division

[&]quot;light feeds



Scientifically established principles of magnetic chuck design—utilizing balanced polarization and (most important) control of magnetic motive force away from machine tool tables and spindles, form the basis of successful holding for milling operations. Walker Magnetic Chucks for milling reduce hand time, expedite production, extend cutter life, decrease costs.

O. S. WALKER CO.Inc.

WORCESTER 6, MASSACHUSETTS

Original Designers and Builders of Magnetic Chucks

BLUE BOOK'S Know How Reference Sheets

Surface Cutting Speeds for Various Grades of Cold Drawn Steel on Automatic Screw Machines

Speeds given below are approximate and are to be used only as a basis from which proper speeds for the part may be calculated. The figures represent the averages for the general run of parts made from cold drawn steel. Any extraordinary features in the part to be made should be taken into consideration and speeds altered accordingly. (Grades not listed may be interpolated from the speed and feed values of the listed grades most similar in chemistry.)

ALLOY STEELS

A.I.S.I. No.	S.A.E. No.	Surface Feet Per Minute	% Relative Speed Based on Å.I.S.I. B1112 (S.A.E. 1112) as 100%	A.1.S.I. No.	S.A.E. No.	Surface Feet Per Minute	% Relative Speed Based on A.I.S.I. B1112 (S.A.E. 1112) as 100%
3145*	3145	105	64	5150°	5150	105	64
3150*	3150	100	60	5152*	_	105	64
E3310*	3310	85	51	E50100*	50100	70	42
E3316*	_	80	49	E51100°	51100	65	40
4017	4017	130	78	E52100*	52100	65	40
4023	4023	130	78	6120		95	57
4024	_	130	78	6145°	-	110	66
4027	4027	110	66	6150°	-	100	60
4028	_	120	72	6152*	-	100	60
4032°	4032	125	76	8615	_	115	70
4037*	4087	120	72	8617	_	110	66
4042°	4042	115	70	8620	_	110	66
4047*	4047	110	66	8622	_	110	66
4063*	4063	85	51	8625	_	105	64
4068°	4068	80	49	8627	-	105	64
4130°	4130	120	72	8630°	-	120	72
E4132*	_	120	72	8632*	-	120	72
E4135*	-	115	70	8635°	COMMO.	115	70
E4137*		115	70	8637*	-	115	70
4137*	4137	110	66	8640*	-	110	66
4140°	4140	110	66	8642*	_	110	66
4142*	-	110	66	8645*	comito	105	64
4145*	4145	185	64	8647*	_	100	60
4147*	_	185	64	8650°	_	100	60
4150°	4150	100	60	8655*	1000	95	57
4317*	4600	180	60	8660°	_	90	54
4320*	4326	100	60	8720	mante	110	66
4337°	_	90	54	8735°	-	115	70
4340°	4340	95	57	8740*	-	110	66
4608		110	66	8742	_	110	66
4615	4615	110	66	8745°	-	105	64
E4617	-	105	64	8747°	_	109	60
4620	4620	110	66	8750°	_	100	60
E4620	_	105	64	9255°	-	90	54
4621	_	110	66	9260°	_	85	51
4640°	4640	011	66	9261*	-	80	49
E4640*	-	85	51	9262*	_	80	49
4812"	-	85	51	E9310°	-	85	51
4815*	4815	85	51	E9315*	_	89	49
4817"	-	89	49	E9317°	_	80	49
4820°	4820	80	49	9437*	-	110	66
5045"	_	115	70	9440*	_	110	66
5120	5120	125	76	9442*	-	110	66
5130	_	95	57	9445*	-	105	64
5132*	-	120	72	9747*	_	105	64
5135*	_	120	72	9763*	-	90	54
5140°	5140	115	70	9840*	-	85	51
5145°	_	110	66	9845*	_	80	49
5147*	-	110	86	9850°	-	75	45

*annealed

Courtesy: Republic Steel Corp. Union Drawn Steel Division

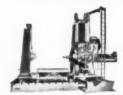
NEW MACHINE TOOLS-



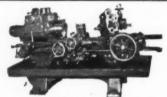
Radial Drills-2', 3', 4', 5', 6', 7', 8', and 10'.



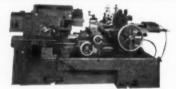
GU Model RU-1000 Universal Cylindrical Grinder, 10"x40".



Horizontal Boring Mills, Table & Floor Type, up to 10"; Rotary Tables of Desired Sizes Available.



Ram & Saddle Type Turret Lathes, Nos. 3. 4. IA. 2A. 3A.



New Automatic Electro-Cycle Turret Lathe, Auto-Cycle, Ram-type, Model 40-E.



No. 4 Di Pale Dial Type High-Speed Plain Milling Machine Available. Also: Nos. 2, 3, 4, 5, 6, 10, Plain, Universal & Vertical.





with built-in 25½" rotary table. Overall size rectangular table: 30"x61". Table Travel 69".

Morando 54" Vertical Boring Mill, Model TVK-120, with Three Heads; Swings 61"; Hydraulic Preselector.

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Wheel Speed

The speed at which a grinding wheel revolves is important. Too slow a speed means wastage of abrasive without much useful work in return, whereas an excessive speed may result in hard grinding action and may introduce the danger of breakage. As a general proposition, it is better to operate a grinding wheel at somewhere near the speed recommended by the maker, as he has found by years of experience that certain speeds work better than others. The grain, grade and structure usually recommended for a certain grinding operation are based on the assumption that approximately the recommended speeds will be employed. If for some reason they cannot be, then the grade at least must usually be changed to suit this condition.

 Internal grinding
 2,000 - 6,000

 Snagging, offhand grinding (vitrified wheels)
 5,000 - 6,000

 Snagging (rubber and Resinoid wheels)
 7,000 - 9,500

 Surface grinding
 4,000 - 6,000

 Knife grinding
 3,500 - 4,500

 Hemming cylinders
 2,100 - 5,000*

 Wet tool grinding
 5,000 - 6,000

 Cutlery wheels
 4,000 - 5,000

	Diameter of Wheel In Inches		THICKNESS OF WHEEL, INCHES																	
	Dian of W In Ir	1/4	3/6	1/2	8/8	34	1	11/4	11/2	1%	2	21/4	21/2	234	3	31/4	31/2	4	4 1/2	б
								Di	ame	ter	of	Spin	dle	-	Inc	hes				
1	2 3 4 5	16 14 16	1/4/8	/8 /8 /2	1/4 8/8 8/8 1/2	1/4 3/8 3/8 1/2	5/8 1/2 1/2		***	***	***					• • •		***	***	***
,	6 7 8	1/2 1/2 8/8	1/2 1/2 8/8	1/2 1/2 8/8	3/2 3/2 5/8	1/2 8/8 8/8	1/2 8/8 5/8	8/8	5/8 5/4 5/4	% % %	1 34	1 34	1 34	1 34	1 1 1	111	134	1 1 1/4	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1/4
	9 10 12	5/8 8/4 8/4	8/8 8/4 8/4	5/8 3/4 3/4	5/8 8/4 3/4	8/4 8/4 8/4	1 3/4	1 3/4	1 3/4	1 1 1	1 1 1	1 1 1	1 11/4 11/4	1 1¼ 1¼	1 1/4 1 1/4 1 1/4	11/4 11/4 11/4	11/4 11/4 11/4	1 1/4 1 1/4 1 1/2	1 1/4 1 1/2 1 1/2	11/2
)	14 16 18	₹6 	7/8	7/4	₹6 ::	1 1¼ 1¼ 1¼	1 1 1/4	1 ½ 1 ½ 1 ½	1 1/4 1 1/4 1 1/4	11/4 11/4 11/2	1 1/4 1 1/2	1 1/4 1 1/2 1 1/4	1 1/4 1 1/2 1 1/2	1 1/4 1 1/2 1 1/2	13/2 13/2 13/2	1 ½ 1 ½ 1 ¾	$1\frac{1}{2}$ $1\frac{3}{4}$ $1\frac{3}{4}$	$\frac{1\frac{1}{2}}{1\frac{3}{4}}$	1 ½ 1 ¾ 1 ¾ 1 ½	13/4
	20 24 26	**					1 1/2	11/2	1 1/2 1 1/2 1 1/2	1 ½ 134 134	1 ½ 184 184	1 ½ 1 ¾ 1 ¾ 1 ¾	1 ½ 1 ¾ 1 ¾ 1 ¾	$\frac{134}{134}$	184 134 2	13/4 2 2	17/8 2 2	11/8 2 2 1/4	11/8 2 2 1/4	17/6 2 2 1/4
	3 0 36	::	::		**				1	13/4	2 14	2 1/4	2 2 1/4	2 1/2	2 3/2	21/2	21/4 28/4	234 234	21/2 3	3



PHOTO COURTESY DELTA MANUFACTURING DIVISION

Manhattan Cut-Off Wheels More Use Per Dollar

FASTER, CLEANER CUTTING . . with Manhattan Cut-Off Wheels means savings in hours and dollars. And Manhattan Cut-Off Wheels are noted for their long life and free cutting on all types of metals. In factories where records are kept of the number of cuts per wheel, Manhattan wheels consistently show that they are doing a *better* job and giving MORE USE PER DOLLAR. Investigate for yourself



the savings that are possible with Manhattan Cut-Off Wheels. When you specify "Manhattan", you are ordering a wheel that is designed for your specific job, which means that it is custom-tailored for efficiency and economy.

WRITE TO ABRASIVE WHEEL DEPARTMENT



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Wake Up the Shop Daydreamer

By Edmund Mottershead, President,

Mottershead & Associates

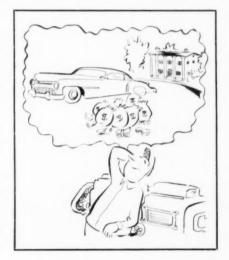
Cartoons by Glueckstein

WHAT do you do about the worker who spends so much time daydreaming about all the great things he's going to accomplish in the future that he has little energy left to do a decent day's work today?

Such a dreamer was Alex, a young worker in Pittsburgh. Alex was in many ways a fine guy and a well meaning enough worker, but his head was constantly in the clouds. He was easily the least realistic and hard-headed man in the plant.

"I'm gonna get me a Caddy some day," he would muse to anyone within earshot. "Yessir, me and the wife have big plans for the future. This job is just something to get me started. I'm not going to sweat my life away in here. Nope, there are bigger things in the cards for us. My kid's going to have the best of everything; he's not going to be like his old man. I never had a decent break in my whole life.

I know what it's like to struggle all the way, and my kid isn't going to go through the same thing. The wife's



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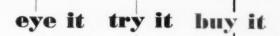
FOR OVER 75 YEARS NEW HAVEN 5, CONNECTICUT PROFILE BLADES AND BAND SAW BLADES MAND AND POWER HACK SAW BLADE



had it tough, too, but not for longwe're getting there. Some day, we're going to have our own home-classy too, not just some dump. I'm going to to get someone to do the housework so Ann can take it easy, and we're going to have enough dough to get the things we want. Not rich, you understand-just comfortable. First, we'll get a big TV set . . ."

And on and on. It's not just a coincidence that so many dreamers like Alex talk about the same things . . . the same hopes and plans, the same complaints and gripes. They all talk about the "tough" time they've had getting along, about how they don't want their children to face the same hardships, about how much their wives have endured.

They all talk alike, because they all are motivated by similar psychological and social impulses. The daydreamer often is a fellow who has wearied of the struggle which is, after all, life itself, and has deluded himself into thinking that it all is unnecessarythat there is some easy way to get along. Because they have become lazy, they naturally turn for satisfaction to daydreaming about a better future, After all, it is a lot easier to constantly formulate rosy plans for the years



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*One of the best methods of indicating cracks or flaws in the structure of steel.









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ahead than it is to work hard today for a better tomorrow.

And so it goes. The daydreaming worker has a lackadaisical attitude toward his work, a condescending attitude toward his fellow employees and a resentful attitude toward his foreman and the plant executives. The result is, of course, a slowing down of department efficiency and even productivity, and a tendency toward lowering of worker morale.

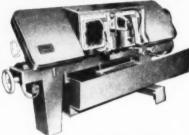
What can the foreman do about the daydreamer in the plant? Let's see how Alex's foreman, Stanley, handled the situation. Stanley was annoyed with Alex for a long time for not putting in a full day's work. He casually told him a couple of times to stick to the work and cut the chatter, but this didn't do much good. Alex stayed on the job, physically speaking, but he was still mentally immersed in some far-away cloud.

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with precision metal sawing at lowest cost . . . another reason why it will pay you to specify Kalamazoo Metal Cutting Band Saws. Three models, all available with coolant system and casters.

MACHINE TOOL DIVISION

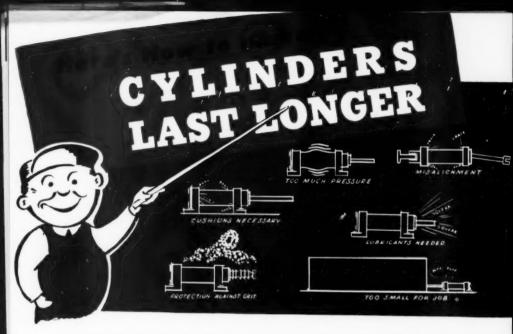
Kalamazoo TANK and SILO CO.

932 HARRISON ST., KALAMAZOO, MICHIGAN

Stanley hated to get really rough with the guy, because he didn't feel Alex had that kind of treatment coming to him. However, he knew he had to do something. He knew that his job was to make Alex realize that he was kidding himself by thinking that "better days" would come along automatically. He had to make him come to see that he had to work and work hard for what he wanted for himself and

his family. Most important of all, Alex had to understand that hard work was not hopeless drudgery—he had to regain his respect for the value of real human effort. In short, he had to regain his pride and self-respect.

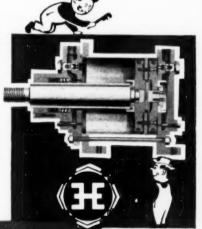
Stanley knew this would be no easy task. He was aware of the fact that a "lecturing" approach would be fore-doomed to failure. The daydreamer won't be moved by naked logic, no mat-



WHEN YOU INSTALL air cylinders, you want to insure long life and trouble-free performance. That's why it pays to use cylinders of ample capacity and operating pressures that do not exceed maximum cylinder ratings. Improper cylinder mounting styles and misalignment of the piston rod with the load often cause trouble. Where atmospheres contain moisture or abrasive dust, piston rod protective boots should be used. Filters and lubricators help insure clean lubricated air—essential to smooth cylinder and valve operation and long cylinder life. Speed control valves and standard or "super" cushions may be advisable, particularly in moving high inertia antifriction loads.

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speed, and ability to Because the Reid grinder lessens operator fatigue for the original and steps up production, it is a profitable tool.

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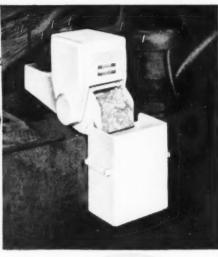


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Installation of a Sundstrand Magnetic Coolant Separator on a grinder, as shown above, resulted in a yearly saving of \$1927.12. Further, instead of cleaning the coolant tank twice daily, it now requires cleaning only *twice weekly*. Cost of the installation is approximately \$475.00. The unit requires no attention and little or no maintenance.



An important feature of this magnetic coolant separator is that it can be dropped into position on most open type coolant tanks. No additional piping is required. Install one on your present equipment and compare its efficient operation with other units.









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Division of Sundstrand Machine Tool Co. 1020-9th ST. + ROCKFORD, ILLINOIS

There's a reason 76%*

of all popularly-priced Tool and Cutter Grinders sold in 1952 were "Knack - Outs"



ter how persuasively it is presented. His is more than a mental state; it is primarily an emotional condition. Alex would have to be brought along psychologically as well as logically.

Stanley knew that he had to rely on the respect Alex had for him as foreman. So he set out to reinforce that respect. He treated Alex on a mature and equal level and avoided "talking down" to him. He began telling Alex about his own boy just out of college.

"I don't know what some of these youngsters today expect to get out of life, Alex," he would say. "Take my own boy for instance. That kid worries more about security and the fact that he's going to have to put in a lifetime of working. He wants all the good things money can buy, but he has a terrible time adjusting to the fact that he'll have to work to get that money.

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ACCURATE because table and column exactly squared one to the other.

LONG LIFE because of hardened and ground spindles.

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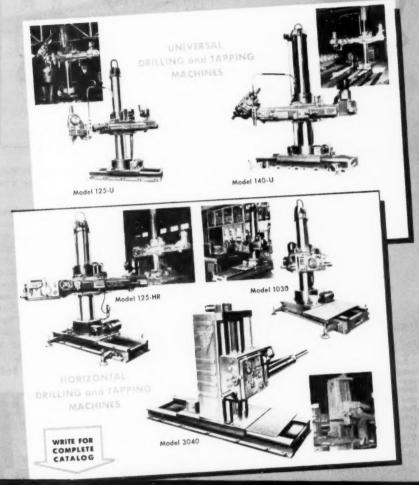
He's beginning to grow out of it now, though. I guess it's a stage we all have to go through."

Did Alex get resentful and think his foreman was kidding him? No, not at all, for Stanley made sure he always kept Alex on his side psychologically.

"Well, I suppose you're facing the same kind of thing with your kid. You know what it's like to have to teach the youngsters the economic facts of life. To tell you the truth, Alex, I used to get kind of discouraged myself once in awhile, but I got straightened out. I had to work hard to make foreman. but it was worth it, I tell you."

Stanley used this approach with Alex consistently, and the message slowly began to seep in. Alex seemed to take new interest in his work; he stopped talking in "pie in the sky" terms. He began conscientiously devoting his energies to doing a better job. He was obviously beginning to take pride in

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accomplishment on the job, and it was a real possibility that he had his eye on future promotion.

You don't have to be a psychoanalyst to bring about a similar change in the attitude and working habits of the day-dreamers in your shop. What they need primarily is a jolt to snap them out of the optimistic lethargy they have fallen into, and an understanding approach designed to make them see themselves as others see them is what you have to devise. All it takes is the willingness to analyze the particular problem you face and to exercise a great deal of patient understanding.

The End.



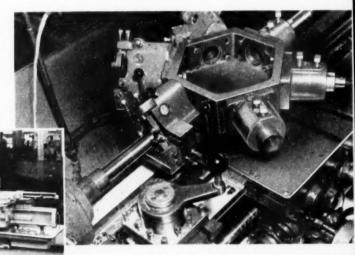
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take shaft jobs Like This:

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Yes, even in lots as small as 5 or 10 parts, you can't heat turret lathes on this kind of work. Parts are machined complete in 2 operations total time is less than 4 min.



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no extra equipment needed!

With no more than your standard bar equipment, you're all set to cut machining costs on shafts like these. No previous operations... such as cutting to length or centering... are necessary. And with two or more tools from turret and side carriage, you have the basic advantage of turret lathe economy—the time saving that means lower costs.

Before you turn to extra equipment or special attachments, look into the possibilities of doing the job the quick and easy way on Gisholt Turret Lathes. Gisholt engineers will gladly help you.

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If It's Worth Marking—Mark It Well.

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1802 Belle Plaine Avenue Chicago 13, Illinois

Victor Equipment Company Cuts Cost, Increases Production

By Fred M. Bort

VICTOR EQUIPMENT COMPANY with main plant in San Francisco, is nationally known as the leading manufacturer of all sorts of welding and cutting torches, nozzles, tips, attachments, regulators, manifolds, controls, etc., also carrying a complete selection of welding machines, accessories and supplies.

In their manufacturing operations particular attention has been paid to the utilization of new machines whose functions have been augmented by the development and application of more efficient work-holding devices and other improved jigs and fixtures. With these accessories many of the machines have been made fully automatic in operation and others semi-automatic for improvement of quality control and production efficiency, resulting in lower costs.

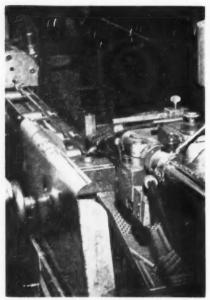
Most of the raw materials consist of brass and copper rod and tubing, and brass forgings which are stored for quick and convenient accessibility.

An automatic cut-off saw, figure 1, 3" diameter capacity, is used to cut tubing, bar and rod. After the length

of the cut is set, the material is automatically fed to the saw until cutting is completed, while, at the same time, the operator may be trimming welding tip tubes to proper lengths on another cut-off saw, with a 10" blade.

Close to the raw material storage is a cleaning department, where all parts are cleaned after machining. Parts are carried in stainless steel baskets, suspended from air hoists traveling on a rail. Cleaning is done in vapor degreasers and electrically heated Trichlorethylene. After rinsing, the parts are given an acid dip to remove scale and fine chips. Farther along, in the same room, is a large air compressor that supplies 100-psi air in the main lines running to all parts of the plant where compressed air is required; also a three-stage compressor supplying 2400-psi air for the regulator test stands.

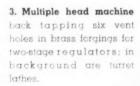
A large number of screw machine parts are used for Victor welding and cutting tips, various nuts, hose connections, swivels, etc., so a battery of five screw machines is used to produce quantities of these products with the larger quantities, in long runs,

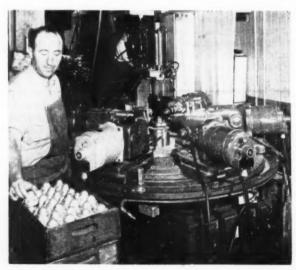


1. Cutting tubing to preset lengths on automatic cutoff saw.



2. Swaging machines: in foreground, swaging cutting tips; in rear, welding nozzles.



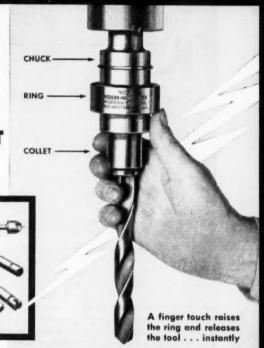


Speed up your production

Change tools without stopping . . . or even slowing the machine

MODERN-MAGIC QUICK CHANGE CHUCK and COLLET EQUIPMENT

examples of the many tools, shown with toll-is attached, driven by MODERN-MAGIC



Modern Precision Tools Include . STATIONARY SELF-OPENING DIE HEADS ROTARY SELF-OPENING DIE HEADS STATIONARY COLLAPSIBLE TAPS ROTARY COLLAPSIBLE TAPS MODERN-MAGIC CHUCKS AND COLLETS SELF-OPENING STUD SETTERS INSERTED BLADE FACE MILLING CUTTERS SOLID ADJUSTABLE DIE HEADS ADJUSTABLE HOLLOW MILLING TOOLS UNIVERSAL CHASER GRINDING FIXTURES

Modern-Magic Quick Change Chuck and Collet Equipment virtually eliminates costly lost time of revolving spindle machines. Used with such machines, tools are changed without stopping or even slowing the spindle. Changes are made from drill to reamer to tap instantaneously and safely while the machine is running at cutting speed. In this way, the Modern-Magic Chuck and Collet Equipment gives multiple spindle range to single spindle machines, increasing production and cutting cost. In high production shops, it has been proved they save time even though used only for changing from dull to sharp tools.

For full information, send for Bulletin M-103. In addition to standard Modern-Magic Chucks and Collets, it shows special types of each.

Only the ORIGINAL Medern-Magic Chuck and Collet Equipment carry the name "MODERN-MAGIC" and are manufactured by Medern Tool Works, Rochester, N.Y.

MODERN TOOL WORKS

DIVISION

CONSOLIDATED MACHINE TOOL CORPORATION
SUBSIDIARY OF FARREL-BIRMINGHAM COMPANY, INCORPORATED
ROCHESTER, NEW YORK



4. Machining die-forged brass needle valve bodies with great production speed in 4-spindle, 5-chuck chucking machine.

jobbed out to specialized machine shops with large batteries of all sizes of screw machines.

Just past the screw machines, very ingenious fixtures are used on swaging machines, figure 2, to swage cutting tip and welding nozzle orifices down to proper diameters. The tips or nozzles, into which oversized orifices have been drilled, are placed on small fixtures containing piano wire of proper diameters which are inserted into the orifices, then placed in the swaging machine, which then reduces orifice diameters to that of the wire. The piano wire in the fixture is then pulled out of the swaged

 Special setup for simultaneous drilling of two opposite ports in needle valve bodies.



tip with an air cylinder arrangement, to be used many times more. When indicated, the wires are checked for size and shape with a micrometer.

Also in this department are two multiple head machines for drilling and tapping separately, or combined, figure 3. These are standard machines that can use up to eight heads but are equipped with Victor-designed, compressed air holding fixtures.

Other machines include two five-chuck, four-spindle chucking machines used for such jobs as machining dieforged, brass needle valve bodies, figure 4, and regulator caps, at greatly increased production speeds. A precision turning lathe, built to Victor specifications, does such types of work as cutting a 39°, 51′ taper on Tellurium copper cutting tips. Two semi-automatic turret lathes, with air operated chucks, are used for machining forgings (cutting torch bodies and similar parts), matching threads on separate units.

Due to growth of manufacturing requirements, space limitations on the two main floors of the building require that the most efficient use of the space available must be made. The previously mentioned operations all take place in one general area on the first floor. However, as all the products manufac-



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6. Vertical turret drill.

tured are relatively small, large numbers of them can be transported in tote boxes from one machine shop to another (or other production area), with completed parts finally coming together in the assembly and testing rooms.

On the second floor is a very efficient drilling department, using much automatic precision equipment. One of these is a special, two-drilling-head setup, figure 5, used for needle valve bodies, for simultaneous drilling of two opposite parts, following this sequence: (1) put part in nest; (2) actuate switches with both hands (safety measure); (3) air-operated arm comes down to hold the part firmly; (4) the moment the holding rod touches the part, a microswitch actuates operation of the two drilling heads set to drill the proper depth; (5) at the end of the cycle, all moving parts automatically revert to original position.

Used on brass torch levers, is a vertical turret drill, figure 6, which in one turn completes the drilling of two parts, each receiving a large clearance drill, tap drill and tap.

On a six spindle, automatic step

driller, figure 7, used to drill 12 ports in welding torch heads of hardware bronze (80% copper), special features, designed and built in the Victor plant, provide a large increase in production speed. The electrical control was changed to air control with an electric timer. The revolving fixture contains six heads, in each of which twelve holes are drilled (34" deep, 48 drill) in an average of one minute. The operation is so completely automatic that, except for loading and unloading, it is virtually foolproof. In a recent run of 6,000 heads (72,000 holes), only one drill was broken.

Another special foolproof setup (with no drill breakage) for drilling parts uses a drilling head, figure 8, with automatic timer for cycling of drilling, operating an indexing head on a special

7. Six-spindle, automatically controlled, step driller; special features which were Victor-designed-and-built for drilling twelve ports in welding torch heads; electric timer, upper right,





Your turning point for lower machining costs can be found in South Bend 9" Lathes. They are exceptionally efficient on small, close-tolerance work. You'll also save on investment, power, tooling, maintenance, space and operators' energy. You'll be surprised how busy you'll keep them. Their versatility permits a wide

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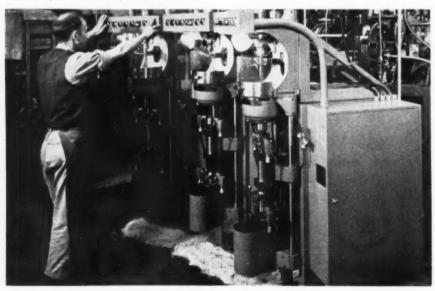
base. Another multiple drilling machine was built up with six of these heads on a large lathe face plate, tiltable to any degree from horizontal to 45° to provide a setup most convenient for the operator.

In the tool room all types of jigs,

8. Drilling head, with automatic timer for cycling of drilling operations. Indexing head on Victor-built base with proper operating adjustment. There is no drill breakage.

fixtures, mandrels, small tools, and even complete machines are built. A good example of the latter are the special high-speed drilling machines for cutting tips. Previously, on two standard. three-spindle machines, total production averaged 125-200 six-hole pieces daily. With the three new units, production has been raised to about 300 minimum. figure 9. These are more compact and faster, drilling six 45, 49 and 52 size, outside holes 21/2" deep, in cutting tips of Tellurium copper. Loading, drilling and indexing six holes is accomplished in about three minutes for each tip. There is practically no drill breakage

9. Battery of special high speed precision drilling machines to drill six outside holes in cutting tips; Victor-designed-and-built.



as the drills are cushioned. Pushbutton controls provide automatic actuation of guides and stops, and all movements can be operated separately.

The center holes (or ports) in these cutting tips are drilled with a duplex vertical air-operated tip driller, with micrometer accuracy, at a speed of up to 150 ports an hour, drill size 65, and drilling depth ³/₄" to 1".

In the testing room, all cutting and welding torches are given actual working tests, then cleaned up, polished and lacquered, ready for the customer (except for welding nozzles which are just cleaned, having been previously polished and lacquered).

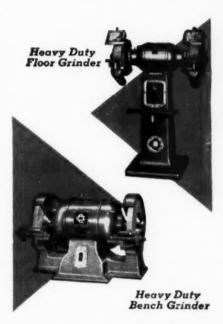
Completed parts, which have passed through successive manufacturing operations, guided by production schedules (including weekly machine loadings), go to the assembly and testing department. After assembly, regulators are tested for leakage with compressed air at from 2100 to 2400-psi, then they are polished, lacquered and painted before being put into stock. Painting provides identification colors for hose connections: green—oxygen; red—acetylene; yellow—air.

Besides the major production of welding equipment in the main factory in San Francisco, the Alloy Rod and Metal Division plant in Los Angeles produces hard-facing alloy welding rods and sand-blasting nozzles. To augment San Francisco factory production, welding and cutting apparatus parts are sent to the Los Angeles and Chicago branches for final assembly.

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New Diamond Wheel Grinds to a Depth of 1/8 in. in Carbide Without Loading

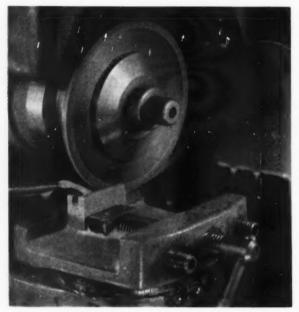
By William F. Schleicher

A FEW days ago I witnessed an amazing demonstration of a new diamond wheel at the Action Diamond Tool Co.. 4545 W. Grand Ave., Chicago. A K3H Kennametal blank was ground to a depth of 1/8 in. and width of 1/8 in. in one pass with a new metal-bonded diamond wheel called Jetaline. The length of cut was approximately one inch. One minute was required for the cutting operation, at the end of which the carbide was cool to the touch. The new diamond wheel does not heat the work, due in part to the coolant which must be used. The wheel was neither glazed nor loaded at the end of the cut, nor were the wheel edges dulled or worn. The carbide blank presented sharp corners at the end of the cutting cycle.

Action Diamond Tool Company, the inventors of Jetaline, told me the wheel will grind a carbide blank 10 in. long to a depth of ½ in., maintaining sharp corners for the entire length of the cut.

Action Diamond Tool Company was one of the first American manufacturers to manufacture and sell diamond wheels for the dental trade; however, with the outbreak of World War II they found it just as easy to make large diamond wheels as it was to make midgets. They became convinced. during the Korean war period, that developments in diamond wheels were not keeping pace with developments in the materials, especially the carbide field: furthermore, the high cost of diamond wheels and the cost of using them on production led to many substitutions resulting in lowered production and higher final cost. The engineers of Action Diamond Tool Company felt a need for a metal-bonded diamond wheel which would cut the hard materials, such as carbides, ceramics, and others, with speed and efficiency and at lower costs without some of the disadvantages associated with old-type metal-bonded diamond wheels.

One of the headaches associated with metal-bonded wheels has been their glazing and loading, When a diamond



1. A deep cut is being made by the new Jetaline diamond wheel. The new wheel will cut to a depth of 1/8 in. in one pass in one minute. Material is a hard grade of carbide. Photo shows an even deeper cut made in several passes. No glazing occurs throughout the entire grinding operation.

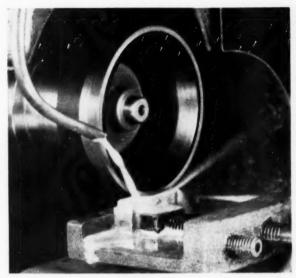
is struck sharply with a hammer it shatters into thousands of fragments: when a diamond wheel, traveling at 4500 s.f.m. hits the work piece the same shattering action takes place and diamonds are knocked off the wheel or shorn off. The bond of the old type metal-bonded diamond wheel was bronze or brass, a soft material. As the diamonds were broken, and subsequently evened with the wheel, the soft bond, due to frictional heat, began to smear over the diamonds and cover the cutting edges. Unless this glaze was removed with a silicon stick the wheel did not grind efficiently and as a result the work became excessively hot. The result is well known. By dressing the wheel to remove the glaze you unnecessarily wore out the wheel, plus the fact that much time was consumed in the dressing operation.

By continuous research and experimentation, the Action Diamond Tool Company discovered the new Jetaline bond. This bond does not have the tendency to adhere to the ground carbide dust which previously clung to and filled all the holes that were made by vacating diamonds. Nor will the alloy, which the bond is composed of, smear or spread in a glazing action which would slow down the grinding efficiency. In fact, the bond is porous to the extent of being able to draw the coolant used on to the cutting surface of the work. Because of these features, the Jetaline bond promotes and supports the great potential cutting action of a diamond.

I saw absolutely no glazing of the Jetaline wheel even after several carbide blanks had been ground to a ½ in. depth. This complete elimination of glazing eliminates the need for continual dressing and also prevents the corners of the wheel from being rounded during the dressing operation.

The non-glazing feature of Jetaline makes it particularly useful for grind-

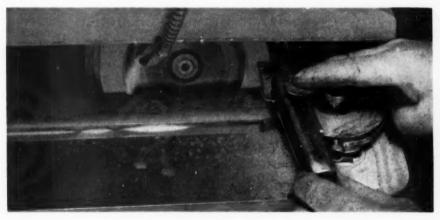
2. Fixed-feed grinding with the new diamond wheel. The bond of this wheel is a tough metal which will not smear or glaze the wheel. The photo shows the depth of cut which can be taken in one pass in K3H Kennametal carbide with the letaline bond.



ing parts which present sharp or narrow contacts which usually cause grooving or corner beveling of the wheel. The new wheel does not bevel or groove but maintains its contours. Yet, the wheel may nonetheless be shaped to various shapes and sizes where the grinding requires specially formed wheels.

Jetaline wheel is adaptable to either fixed-feed or off-hand grinding. While these terms are self-explanatory, the easiest rule of thumb to follow is that fixed-feed means any rigid grinding

3. Off-hand grinding with the Jetaline diamond wheel. A coolant must be used white grinding. No heat is generated during the grinding.





attachment. A good example of fixed-feed is the positioning of the tool to the wheel by means of a vise or fixture as in the grinding of multiple tipped carbide tools, chipbreakers and the cutting or slotting of carbide blanks. Off-hand grinding is when the pressure of the tool against the diamond wheel is applied by hand as in the sharpening of single-tipped carbide tools.

The Jetaline wheel must be indicated to .0005 thousandth of an inch before the operation starts. A soluble cutting fluid. 40 parts of water to one part of oil, is necessary with the use of this wheel. Jetaline, when used properly, should increase production on those jobs where diamond grinding is indicated. Its non-smearing and nonglazing characteristics should do much to eliminate throublesome delays due to dressing: this free-cutting action. coupled with the deep cuts which can be taken, should be a tremendous boost to production. From a cost standpoint it would appear the Jetaline is more economical than resin diamond wheels which have approximately seven times less wearing life, and more economical than present metal-bonded wheels because fewer wheels are needed to perform grinding operations.

The End.

About 45,000 planes not engaged as air carriers over regular routes will be available for civil defense activities if required. The commercial air lines can assign about 1,200 more aircraft to civil defense transportation in case of need.

Neighboring plants in highly industrialized areas are being encouraged to pool their fire-fighting, rescue and first aid equipment for civil defense emergency use. In New Jersey, for example, 10 large plants within a few miles of one another have agreed to exchange disaster equipment and trained personnel in time of need. Extra hose, protective clothing, medical supplies, and trucks are available to all under this plan.

13 Key Moore Tools help put

the PRECISION in Harig Dies



When owner-management invests its money in machinery," says Karl Harig. founder and president of Harig Manufacturing Corporation, "it does so only after a thorough analysis

and careful selection of available equipment." So it's significant that Harig, one of America's foremost producers of carbide, lamination, progressive, stamping and other types of precision dies, employs 13 Moore precision-built machine tools for many of its most critical toolroom operations.

A trip through Harig's modern Chicago plant reveals:

3 MOORE JIG BORERS, for accurate locating and boring of holes in a fraction of the time required by other means,

& MOORE JIG GRINDERS, for relocating and grinding of holes and contours-within tenths-after hardening:

3 MOORE PANTO-CRUSH WHEEL DRESSERS. for speedy, cost-cutting performance of both crush-forming and diamond-dressing on the wheel spindle of a surface grinder;

1 MOORE DIE FLIPPER, for "mechanized" die tryouts and assembly

The combination of Harig craftsmanship and Moore precision tools has been an important factor in Harig's successful effort to meet continuing demands for faster production of intricate dies, tools, jigs, fixtures and gauges.

Why not discover how Moore tools can bring more speed and greater accuracy to your toolroom. Write today for our detailed literature.

Moore Special Tool Company, Inc. 728 Union Avenue, Bridgeport 7, Connecticut



A battery of six Moore Jig Grinders performs precision internal and contour grinding operations on sectional die parts at the Harig plant.



the bulk of Harig's critical spotting, drilling, boring and reaming operations.



Dresser on a surface grinder for fast panto graph profile grinding. Harig also has two more of these cost-cutting units.

A Moore Die Flipper facilitates accurate die tryouts and assembly at Harig, replaces time-consuming hand-labor methods

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Portable Air and Electric Tools for Industry

IN CANADA: Joy Manufacturing Co. (Canada) Ltd., Galt, Ontario

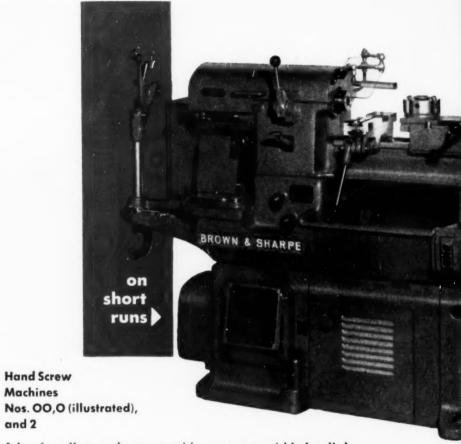
"SPEED-UP" YOUR SCREW MACHINE DEPARTMENTS...



on long runs

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Minimum cost per piece on long and moderate runs is assured with these fastoperating Automatic Screw Machines. Rapid non-cutting movements, together with wide range of spindle speeds and speed ratios, "speed-up" each operation . . . permit top cutting efficiency on a broad variety of materials. The three smaller machines are also made in Automatic Cutting-Off type for manufacture of precision parts requiring only forming and cutting-off.

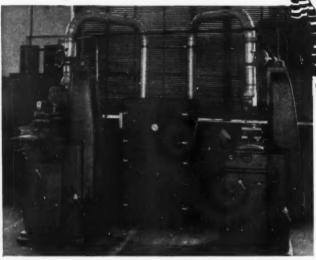


Jobs of small or moderate quantities are more quickly handled on these easy-to-set-up Hand Screw Machines. They perform the same operations as automatics, but do not require cams or timing ... make short runs and second operation work highly profitable. Tooling is economical inasmuch as they use many of the same tools, collets, and fingers as the automatics.

Write for complete information on these machines. Brown & Sharpe Mfg. Co., Providence 1, R. 1., U.S.A.



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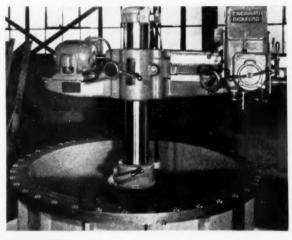
COMPANY

St. Paul 2, Minn.



Fixture for radial drilling of tubs

This tub fixture designed by Carrier Tool Engineers, Dept. BB, 300 S. Geddes St., Syracuse 1, N.Y., with the 3' arm, 9" column radial drill press, mounted centrally in the bottom, is used to drill (40) 13/16" dia. holes in the turret ring flange of a medium tank hull. After finish boring of the turret the fixture is lowered in place, locating by a rabbet tet in the bore and lining up a pointer (not shown) with a center line scribed on the tank. Swing clamps have since been added





to secure the fixture while drilling.

Standing inside the tub the operator drills the 13/16" clear holes through 1-1/16" of cast armor steel at 100 r.p.m. and at a .007 feed.

This fixture, when put in operation, relieved two 7' arm 17" column radial drill presses and one machine operator. In addition, the portable feature of its design resulted in a more flexible sequence of floor operations.

The radial drill is made by Cincinnati Bickford.

Low cost dust control possible with dust collector of right volume

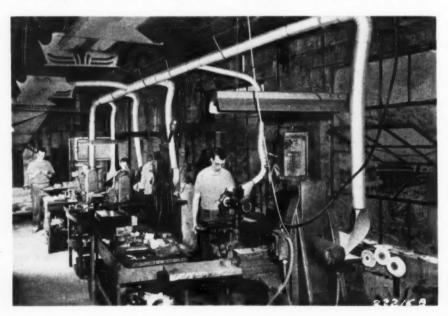
A simple and effective industrial dust control system can be installed in any shop at low cost regardless of whether or not the machines generating the dust are operating at full production capacity. As an example, a tool and die shop wanted to control the dust due to the operation of five surface grinders and a cutter grinder. Five of the machines are located in one row along a wall as shown in the picture, while the sixth grinder is just across the aisle from the other five.

A model 2030 Dustkop dust collector by Aget-Detroit Co., 205 Main St., Ann Arbor, Mich., was selected for this job because it has a rated volume of 2405 c.f.m., sufficient to collect the dust generated by all six machines operating full time.

The dust collector was placed in the corner in line with the row of grinders. From the inlet of the collector, a header pipe was assembled up to and along the ceiling above the row of grinders

and held in place by strap hangers. This header pipe was built up of straight sections of seven-inch galvanized pipe with "T" connectors above each machine except the last. From these "T" joints, and from the end of the header pipe over the last grinder in the row, were hung lengths of flexible metal hose terminated in wheel hoods at the level of the wheel of each grinder. The flexible metal hose makes it possible for the machine operator to change the position of the wheel hood for different positions of the grinding wheel.

Operation of this dust collector is based on an efficient basic design which consists of a motor-driven, self-clearing paddle wheel fan that discharges into a cyclone separator. The dust is deposited out of the bottom of the cyclone separator by centrifugal action into a six-cubic foot storage bin. The cleaned air rises through the center of the cyclone separator and returns to the working area through a fire-safe Fiber-



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COST

Specially Engineered Multiple Operation TOOLS

cut machining and set up time, assuring unsurpassed uniformity and concentricity of finished work

Individually engineered to each particular job, McCrosky"Specials" combine related boring, facing, chamfering and reaming operations:— do them all at the same time with just one tool and one set-up, cutting costs and practically eliminating spoilage.

McCrosky's shop-tested features give them the strength and rigidity of solid tools and permit the blades to be re-



leased and adjusted for regrinding easily
— saving time — and requiring fewer
tools to keep a job running continuously.

Send for Bulletin No. S-17. It illustrates more than 40 applications and will suggest places where you too can use McCrosky "Specials" to produce better products, quicker and cheaper!

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Body can rotate either right or left hand. Consequently, selecting blades with tips of proper material mounted at proper angles produces a cutter that meets any requirement. Write for Bulletin 531.



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Chucking reamers with straight or tapered shanks, also shell reamers with tapered holes or large straight holes. Standard sizes from 15/16" to 6" in diameter. Write for Bulletin 18-R today.



MCROSKY Turrer TOOL POSTS

These tool posts permit tools to be swung into position quickly, indexed accurately, and locked rigidly. Four styles—11 sizes. Write for Bul. 17-T.



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McCrosky's Wizard Quick-Change Chuck and Collet outfits hold tools centered and rigid. They enable the operator to change tools without stopping or slowing down the spindle. Write for Bulletin 18-C today.



MCCROSKY Block Type BORING BARS

Individually ground, tapered V-key centers the block and cutting blades accurately and rigidly yet permits easy release for regrinding. Write for Bul. 17-8.





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this value-adding "Touch of Gold." Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities — see your telephone directory yellow pages. Export: Norton Behr-Manning Overseas Inc., Worcester 6, Mass.



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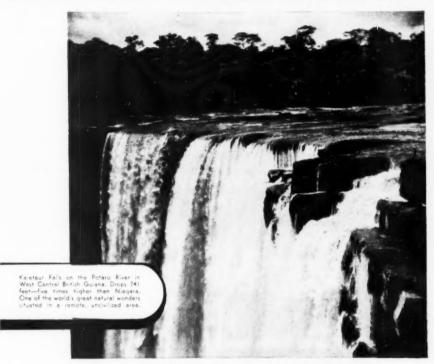
glas filter. Experience has shown that by returning the cleaned air to the work area rather than exhausting it to the outside, an average heat saving results which will equal the cost of the entire installation within six years.

An occasional shaking down of the Fiberglas filter by means of a hand crank conveniently located on the dust collector lengthens the life of the filter so that replacements are needed only at prolonged intervals, and the dust

storage bin is large enough so that periodic emptyings are sufficient.

There were two reasons for selecting a dust collector that had a large enough rated volume to collect the dust from all six dust sources. The first was the fact that all of the grinders are in almost continuous operation and will thereby make use of this entire available rated volume except when machines are down. The second reason is that the machines are located close

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HYDRAULIC CYLINDERS, Cat. 200-2; 200-3 - HYDRAULIC POWER UNITS, Cat. 200-1 - SURE-FLOW COOLANT PUMPS, Cat. 42



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COLLAR NUTS
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COUPLING NUTS
... are two more

and two more additions to the expanding Lodding line. Write for details!

Save at Engineering Level!

2 Save Tool Room Labor!

3. Save with Lodding Quality!



WRITE FOR



to each other avoiding any excessively long runs of duct-work which might otherwise reduce efficiency.

The alternative to having one dust collector serve several dust sources is, of course, selecting a dust collector of smaller rated volume and using one of these collectors for each dust source. Had this same tool and die shop been operating its grinders on a part time basis, it might have been more practical

to install several of the lower volume dust collectors to be operated only when the individual dust sources were in use. Obviously, the decision as to which method of dust control should be used can be made only when a specific layout of dust sources operating at a stated production level within a given shop is being discussed. In this way the best system at the most reasonable cost can be quickly and positively determined.



We Know It's Hard to BelieveBut It's True!

You Can Reduce Tap Costs Up to 75% with the



Reduction of tap costs by as much as 50 to 75% — and more — is reported by leading metalworking firms using the B.P.S.* System. Why not get the same benefits?

HERE IS THE B.P.S. * SYSTEM:

Adopt these two simple ideas: (1) Sharpen your taps at regular, planned intervals and (2) Sharpen flutes and chamfers of taps to an exceptionally high degree of accuracy (possible only on Blake grinders).

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*Blake Precision Sharpening

HERE'S WHAT THE B.P.S.' SYSTEM CAN DO FOR YOU!



BLAKE CHAMFER

BLAKE FLUTE

- Gives much more production per tap!
- Greatly reduces tap costs!
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- Greatly reduces tap breakage and spoiled or unacceptable work!

INVESTIGATE THE B.P.S. SYSTEM NOW !

Write us for reprints of American Machinist and Machinery articles on this subject. Descriptive folders on both Blake grinders also available.





EDWARD BLAKE COMPANY

Black Diamond Precision Drill Grinders . Waltham Cutter Sharpeners . Surface Finish Standards

One operator...two endfinishing machines

Double-end tube deburring and facing operations at Kold-Hold Mfg. Co., Lansing, Mich., where two Pines No. 600 air operated end-finishing machines are employed for machining 3/4" x .028" x 13-17/64" welded steel tubing (SAE 1010-1020) to precision limits, averages 600 pieces per hour.

The machines are bench-mounted adjacent to each other. One man operates both machines simultaneously by means of a single foot control which initiates the automatic clamp, feed, and return cycle for both machines and frees the operator's hands for loading and un-

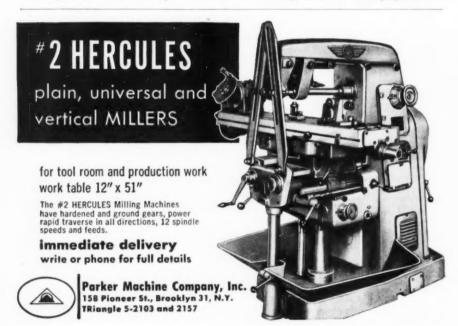
loading purposes.

The machine at the operator's left is especially tooled to handle an inside and outside deburring and facing operation on one end of the tubing. As soon as this operation is completed, the operator flips the workpiece a half-turn, catches it in mid-air with his right hand, and loads the second machine which performs the same operation on



the opposite end of the work piece and also faces to length. At the instant the second machine is being loaded, the operator's left hand is free to reload the first machine and maintain uninterrupted operation. To further simplify production cycling, the work pieces are supplied to the operator from a main conveyor line and finished pieces are dropped into a nearby basket.

Both machines, built by Pines Eng. Inc., Aurora, Ill., are designed for a broad range of end-finishing operations.



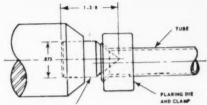
In the standard manual models or with the air cylinder attachment for automatic feed and return operation, it is possible to ream, bore, and face tube and pipe ends, center-drill bar stock, and chamfer or form rod ends.

Kennametal flaring tool gives over 74 times longer life on seamless steel tubes

A midwestern manufacturing company obtained superior product finish and minimized machine down time by replacing a h.s.s. tube flaring tool with one using a standard Kennametal Style CN-140 lathe center nib modified as shown in sketch.

The operation is done on a Leonard Tube Master in which the flaring tool revolves at 1400 r.p.m. and is fed into the clamped end of the seamless steel tube to produce the desired form. The flaring tool is run off-center. The amount of offset depends on the size of the tube being flared.

Tubes ranging in diameter from ¼ inch to ¾ inch are flared on both ends from 11/32 inch up to 25/32 inch re-



LATHE CENTER HIS WITH

spectively, using same flaring tool for all sizes.

Best production with the h.s.s. flaring tool was only 500 pieces or 1000 ends. After this limited run regrinding was necessary because the tool became so rough it caused the tube to heat up and crack or flake off on the inside of flared end

The job is now done with a Kennametal flaring tool, which at time of last report had flared 37,000 tubes or 74,000 ends without any apparent sign of wear. Finish of flared ends continued to be superior to that obtained with freshly reground h.s.s. tool.



Specially designed drill unit cuts costs 25%

By building its own hydraulic drill unit for a boring operation previously done on a standard drill press, Portable Electric Tools, Inc., Chicago, Ill., effected a 25% savings in the cost of the operation and gained more precise tolerances. Specially engineered and designed by PET and the Delta Power Tool Division of the Rockwell Mfg. Co., the machine utilizes two Delta drill units.

Principal operation of the machine is the boring of two brush holder holes in the PET "Super Duty" "4" portable drills. Holes are then used for the location in doing all other machining on the aluminum castings of the drill.

The new machine holds tolerances to plus .0005" and minus .000. Average output per hour is 150 drills. Although in operation for one year, often for three shifts a day, the drill has had no maintenance or repair problems.

Because of its simple, automatic operation, PET uses women operators on the machine. "Overall performance of the drill has been so efficient," said Walter Sundberg, Superintendent of Production Machining, "the company plans eventually to use the same kind of unit for similar operations on its portable saw and ½" drill."

How stamping company uses Mead air power

Mead Specialties Co., Dept. AMS, 4114 N. Knox Ave., Chicago 41, Ill., reports that the Atlas Metal Stamping Co., Philadelphia, Pa., has devised a simple but effective method to size three holes in a gear box and three holes in a cover plate, using two Mead Model 122 air presses. The operation is to place the cover plate or the gear box in a registered position in a jig. Hardened ball bearings are then placed in the respective holes of the plate or box, and the two "fingertip" valves are tripped. When the ram comes down,

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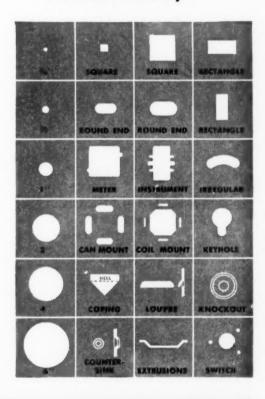
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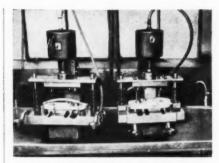
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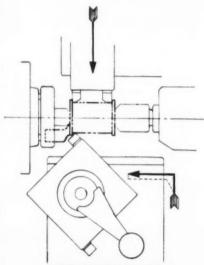
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pins in the upper half of the fixture force the balls through the holes, bringing the holes up to a true diameter. The balls drop into slots in the lower part of the fixture, ready for the next cycle. The valves are connected in series and require both hands—to eliminate danger to the operator's fingers.

Turning operation on cast iron crank

A simple operation on a cast iron crank, including turning, facing and chamfering, on a Sundstrand Model 10



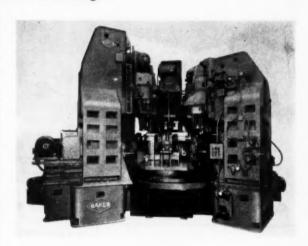
2 POSITION TURRET-TYPE TOOL BLOCK

automatic lathe, is shown in a tooling set up where a turret type block has been mounted on the front slide so that a rough and finish cut is taken on the main diameter of the crank. The machine is cycled twice to obtain the rough and finish cuts with manual indexing of the turret between each cut. This same machine with additional tooling is also used to turn, face and form a number of, other parts including pulleys, spacers and pistons.

New Baker performs multiple operations on clutch housings

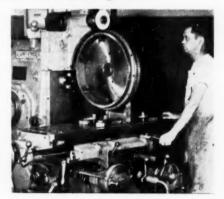
A Baker multi-operation machine utilizing standard Baker 71/2 x 16 and 15 x 16 units and a 72" six-station power indexing table, performs drilling, chamfering, boring, counterboring and tapping operations on clutch housings at the rate of 80 parts-per-hour at 100% efficiency. Units of the new machine, manufactured by Baker Bros., Inc., 1000 Post St., Toledo. Ohio, for a leading automobile company, are mounted in horizontal, vertical and angular planes.

Baker special drilling machines are composed of standard Baker units arranged to suit each individual problem.



Converts milling machine into external grinder

Novel conversion job by Ace-Central States Machine Tool Co., Detroit, Mich., changes a milling machine into an external grinder, saving as much as two days on work of large diameter. By this method, slots can be ground as accurately as holes on a jig borer. Indexing is done by a simple fixture made by Ace-Central States, visible in the photograph. Shown on the machine is a master index ring for a special broaching machine, one of twenty designed and built by Ace-Central for broaching Christmas-tree blade slots on British jet engine stator rings. The setup handles diameters up to 48".



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A special report by the editors of MACHINE and TOOL BLUE BOOK

Report number 33

Grinding Machines . . . part 7

This is the thirty-third in a monthly series of special reports discussing various types of machine tools. Included in this month's special report on grinding machines are:

- 1. Common grinding errors and their correction.
- 2. Descriptions of late model grinding machines.
- 3. Specifications of American-built machines.

Previously published reports discussed: 1. Thread Rolling; 2. Power Press Brakes; 3, 4. 5. Milling Machines; 6. Honing, Lapping, and Superfinishing; 7. Automatic Screw Machines; 8. MAPI Replacement Formula; 9, 10. Chucking Machines, Turret Lathes, Hand Screw Machines; 11. Broaching Machines; 12. Shapers, Slotters, Keyseaters; 13, 14, 15. Lathes; 16. Planers; 17. Gear Making Machines; 18, 19. Boring Machines; 20, 21, 22, 23, 24, 25, 26. Drilling Machines; 27, 28, 29, 30, 31, 32. Grinding Machines.

Common grinding errors and their correction

THIS ARTICLE makes no attempt to capture the interest of the seasoned grinding specialist who got his know-how the hard way through years of experience.

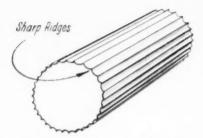
But as a review of fundamental difficulties which occasionally affect cylindrical grinding, it is a valuable guide to the less experienced production man whose immediate concern is a practical solution to his problem.

In almost all instances of poor grinding, the type of trouble is easy to diagnose and simple to correct. If the condition does not yield readily to one of the following measures, the user is advised to call on the field service office of the grinding wheel manufacturer.

Unsatisfactory grinding results show up either as imperfections in the finish of the workpiece, or as inability to achieve consistently accurate dimensions.

Some of the common grinding errors that affect finish are: Chatter Marks, Short Wave Marks, Long Wave Marks, Mottle Marks, Burlap Finish, Diamond Truing Lines, Feed Lines, "Barber Pole" Finish, Burned Work, Cracked Surfaces and Rough Finish.

Types of common dimension difficulties are: Out-of-Round Work (when plunge cutting), Intermittent Cutting Action, Non-Concentric Adjacent Diameters and Inability to Keep Work Straight.



 Chatter marks are easily identified by the sharp ridges which are characteristically found in this type of grinding fault.

Any of the above can be caused by improper grinding technique, or by malfunctioning of the machine. The trouble-shooter should be alert to the possibility that his difficulties are being caused by more than one factor; neglected grinding equipment can be a Pandora's Box of poor results, for example.

Chatter Marks

This type of trouble is illustrated in figure 1. Basically it is caused by conditions leading to vibration of the grinding wheel against the workpiece. Wheel contact is intermittent or lost during grinding, causing characteristic sharp-peaked ridges. Any of the following can cause Chatter Marks:

- 1. Too heavy a grinding cut.
- 2. Grinding wheel grade too hard.
- Insufficient steadyrest for slender workpiece.
- 4. Overspeeding grinding wheel.
- Vibration from either an external source or from within the grinding machine.

As will be true of most of the grinding errors mentioned, the description of the cause will suggest the corrective measure for Chatter Marks.

Short Wave Marks

Where the forces are not great enough to cause the wheel to lose contact with the workpiece, a type of imperfection known as Short Wave Marks occurs. As can be seen from figure 2, this grinding error is similar to Chatter Marks, differing in that the ridges have rounded contours rather than sharp peaks. It is caused by vibration which results from any of the following sources:

- Equipment external to the grinding machine, such as belts, pumps, motors, chains and sprockets, etc.
- Sources within the grinding machine, such as a head seal that is too tight, or imperfect gear action.

Long Wave Marks

Long Wave Marks resemble Short Wave Marks closely, except that they are spread out on the work surface from a quarter inch to one inch, depending on speed of the wheel and the work, figure 3. They can be caused by any of the following:

- 1. A new wheel being out of balance.
- Wheel sleeve balance weights not properly adjusted.
- 3. Coolant flowing after wheel stops.
- 4. One side of wheel soaked with oil.5. A wheel that has stood on a damp
- 5. A wheel that has stood on a damp floor.

 It is good practice to run the wheel

It is good practice to run the wheel with the coolant off for a short period at the conclusion of the day's grinding. This eliminates an "out-of-balance" condition caused by coolant draining to the lower section of the wheel.

Mottle Marks

This type of error, closely related to Long Wave Marks, occurs most frequently on work that is traverseground. It is characterized by wave lines that do not match up, and is caused in most instances by an out-of-balance wheel condition. Causes are:

- Balance weights not adjusted after mounting a new wheel.
- Stopping wheel without turning off coolant.
- 3. Wheel partially soaked with oil,



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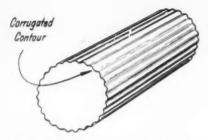
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FROZEN ACTION — Tiny steel chip (A) is shown being cut from workpiece (B) by a grinding grit (C).



EXPERIMENTAL WHEEL'S performance is checked by member of research staff on one of several grinders in the Cincinnati Grinding Wheels Laboratory.



2. A wavy surface is the distinguishing feature of Short Wave Marks.

or damp on one side.

- 4. Grease or oil spots on wheel face.
- 5. Hard spots on wheel surface.
- Lead or soft metal imbedded in wheel surface.

Burlap Finish

The pattern of this imperfection is similar to that of burlap cloth, but identification is usually more difficult when another type of grinding error is present in the workpiece at the same time. It is most often caused by one of the following conditions:

- 1. Loose diamond nib.
- 2. Vibration of diamond tool support.
- 3. Uneven table traverse when truing.

Diamond Truing Lines

Diamond truing lines are spirals or lead lines which are trued into the grinding wheel and transferred to the workpiece. They are caused by the following conditions:

- 1. Diamond too sharp.
- 2. Table traverse too fast.
- 3. Wheel too hard.

Try a diamond which has been used; it usually has several relatively flat portions, one of which can be used for truing. If a softer wheel cannot be found, use one which has a small diameter temporarily, and obtain a suitable wheel. Use of the coolant flow

while dressing will assist in diamond conservation.

Feed Lines

This error is typical of work being traverse-ground. Its cause may be grinding procedures, or worn parts of the grinding machine. Often the cause is among the following specific conditions:

- 1. Wheel not suitable.
- Improper control of traverse of work speed when finishing.
- 3. Improper distribution of coolant when truing wheel.
- 4. Improper use of steadyrests.
- Head and footstock out of alignment.

"Barber Pole" Finish

This fault occurs only on traverseground work, and is due to the work moving to and from the wheel as it traverses, resulting in the spiral pattern showing on the workpiece. In extreme cases the work and wheel will lose contact intermittently. Causes of "Barber Pole" Finish are:

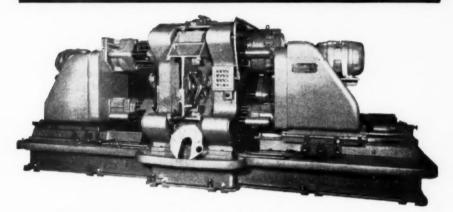
- 1. Improper lubrication of table ways.
- 2. Work loose on centers.
- 3. Centers do not fit spindles.
- 4. Loose fitting footstock spindle.

Burned Work and Cracked Surfaces

While the foregoing grinding faults usually yield to simple corrective measures which can be readily applied by the user, when Burned Work or Cracked Surfaces occur it may be necessary to call an abrasive engineer for help in correcting the condition. Possible causes are:

- 1. Grinding wheel too hard.
- Structure of grinding wheel too dense.
- 3. Grinding wheel of improper bond.
- 4. Grinding wheel overspeeded.
- 5. Work revolving too slowly.
- 6. Grinding cut too heavy.

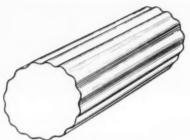
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3. Long Wave Marks are similar to those in Figure 2, except for a relatively greater distance between wave crests.

- 7. Insufficient coolant.
- Nozzle not directing coolant properly.
- 9. Wrong coolant.
- 10. Grinding wheel improperly trued.

Rough Finish

What constitutes "rough finish" will differ according to whether the user expects to obtain a finish specified in micro-inches, or one which can be described as "good commercial" finish. In either case, if the quality of finish is not adequate to meet specifications, the situation can be improved by altering one or more of the following conditions:

- 1. Wheel too coarse or of wrong grade (hardness).
- 2. Diamond too sharp.
- 3. Truing too coarse.
- 4. Cut too heavy.
- 5. Traverse too fast.
- 6. Work speed too fast.
- 7. Lack of proper steadyrest supports.
- 8. Dirty coolant.
- 9. Coolant solution too weak.

Out-of-Round Work

This fault, which occurs when plunge cutting, can originate from many conditions. The trouble-shooter can get to the root of the trouble by eliminating the following from consideration, one by one, until the actual cause is determined:

- Centers loose in spindles because of dirt or oil.
- 2. Centers do not fit spindles.
- 3. Center points out-of-round.
- Workpiece center holes out-ofround or not in line.
- Workpiece center holes not sufficiently deep.
- 6. Burrs in workpiece center holes.
- 7. Work centers scored.
- Center points worn down, or insufficiently lubricated.
- 9. Work loose on centers.
- 10. Work too tight on centers.
- 11. Insufficient coolant.
- 12. Worn footstock spindle.
- 13. Misalignment of workheads.
- 14. Swivel table gibs loose.
- Angle of centers in workpiece do not match angle of work center point.
- 16. Improper use of steadyrests, particularly when grinding long, thin shafts. Correct this by locating a sufficient number of steadyrests along both sides of the workpiece (use same number on each side), thereby restoring rigidity to the setup.

Intermittent Cutting Action

The preceding list of faulty conditions, in addition to causing Out-of-Round Work, also are very likely to cause Intermittent Cutting Action, and should serve as the first check list for the trouble-shooter seeking to correct improper cutting action.

In addition, however, there are other possible causes of Intermittent Cutting Action, such as the following:

- 1. Heavy work too tight on centers.
- 2. Work out of balance.
- 3. Base high in the middle or at one or both ends.
- 4. Foundation moving or settled.

This being another of the more difficult conditions encountered, the user

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- 6. Universal Feed Table
- 7. Internal Grinder Head
- 8. External Grinder Head
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 - D. Geared Dividing Head

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Milling on turret lathe completing part



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Master Slotting Head on lathe cutting internal taper keyway



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should call on his abrasive engineer for help if the above check list fails to lead him to the proper corrective measure.

Non-concentric Adjacent Diameters

This is a difficulty which is typically encountered when large work is being ground on large grinding machines. There are only a few causes, and correction is easily attained:

- 1. Work is loose on centers.
- Centers are not in alignment in workpiece.
- Headstock or footstock is moving away from work.
- 4. Centers do not fit the spindle.
- 5. Base is out of alignment.

In addition to the foregoing, which describes various corrective measures for some of the common grinding faults, the user is well advised to become thoroughly acquainted with the information given in the various booklets (listed below), which are available at no charge by writing the Grinding Wheel Institute, 2130 Keith Bldg., Cleveland 15, Ohio.

- 1. Grinding Wheels—Standard Shapes and Sizes of Grinding Wheels—(Simplified Practice Recommendation R45-47 National Bureau of Standards.) This booklet sets forth industry standards for grinding wheel shape types with detailed dimensions. All wheels listed also are classified according to basic uses.
- 2. Abrasive Grain Sizes—(Simplified Practice Recommendation 118-50 National Bureau of Standards.) This booklet lists the allowable limits for the sizing of aluminum oxide and silicon carbide abrasives both for grinding wheel manufacture and for polishing purposes.
- 3. American Standard Safety Code for the Use, Care and Protection of Abrasive Wheels—(American Standards Association ASA B7.1-1947.) The scope

of this publication includes rules and specifications for protection hoods, flanges, chucks, and revolving cup guards and rules for the proper storage, handling and mounting of wheels. It gives minimum arbor sizes and maximum safe operating speeds of grinding wheels.

- 4. Specifications of Segments used in Chucks—(Grinding Wheel Institute, 2130 Keith Building, Cleveland 15, Ohio.) This booklet contains diagrammatic sketches of chucks showing the holding mechanism as well as complete dimensions for all standard shapes listed.
- 5. Mounted Wheels and Points, Safe and Efficient Operation—Critical Speeds (Grinding Wheel Institute.) This booklet lists all standard mounted wheel shapes giving general rules for safe operation together with tables of critical speeds.
- 6. Disc Grinding—Safe Rules and Methods—(Grinding Wheel Institute.) The purpose of this booklet is to describe the special features of disc grinding and to illustrate recommended practice with respect to mounting procedures and the use of safety techniques.
- 7. Handling, Storage and Inspection of Grinding Wheels—Safe Rules and Methods—(Grinding Wheel Institute.) This booklet presents proven methods and rules to follow for the safe storage, handling and inspection of grinding wheels.
- 8. Mounting Techniques for Wheel Sleeves on Cylindrical Grinding Machines—(Grinding Wheel Institute) 2P-3-52. This publication deals exclusively with the elimination of wheel breakages on cylindrical grinding machines by recommending the specific amount of "wrench pull" for the operator to use when mounting wheels on each of the more common types of cylindrical grinding machines.



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9. Safe Speeds for Grinding Wheels—(Grinding Wheel Institute) 1P-42. This booklet, based on the rules in the ASA Safety Code B7.1-1947, discusses established rules governing the proper speeds to be used for safe grinding wheel operations, touching on wheel strength, peripheral speeds and the over-all efficiency of low safe speeds in respect to reduced wheel breakage.

10. Portable Grinding Machine, Safe and Efficient Operation—(Grinding Wheel Institute) 4P. The purpose of this booklet is to outline the conditions that are likely to cause trouble and to provide information regarding the safe

use and maintenance of Portable Grinding Machines for both the workman and the supervisor.

11. High Speed Grinding Machines—Heavy Duty Maintenance of Swing Frame and Floor Stand Machines—Large Hole, Organic Bonded Wheels—(Grinding Wheel Institute.) This booklet outlines in general terms the conditions largely responsible for trouble if not corrected, and supplies information needed to facilitate proper inspection and maintenance of that portion of the equipment that affects the safety of the wheel.

Description of late model grinding machines

Landis 10"-14" type CH plain

Microsphere wheel spindle bearings are a feature of this grinder, made by the Landis Tool Co., Waynesboro, Pa. Among other features of this grinder are: eye level wheel feed and centralized controls; double cylinder table traverse which assures uniform carriage movement and constant speed in both directions; pressure lubrication for carriage and wheel base ways to maintain proper lubrication at all times.

The work carriage may be traversed by hydraulic power or hand operation. The hydraulic power traverse speeds are infinitely variable from 3 to 240 inches per minute on machines up to and including 72" lengths. A two cylinder type table traverse is used to move the work carriage. This arrangement

assures the same rate of movement in both directions.

Norton 10"x36" CTU semiautomatic

This grinder, made by the Norton Co., Worcester 6, Mass., has qualifications for either job shop work or for work on the production line. It is available as plain or semiautomatic.

Several features of this grinder are: preset truing and grinding speed control; wheel guard cover highly accessible, hinged for maximum ease in wheel change; base ways protected by steel-type guards; heavy wheel spindle in widely spaced bearings; work jogging control; automatic wheel feed at each table reversal; automatic work startstop; automatic coolant control.





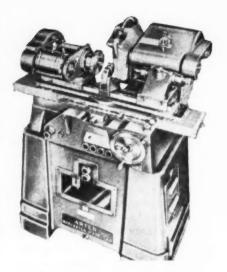


Cincinnati 12" universal hydraulic grinder

This grinder, made by the Cincinnati Milling Machine Co., Cincinnati Grinders. Inc., features Filmatic spindle bearings which rigidly maintain deadcenter rotation. The grinder has automatic headstock and coolant control, coordinated with the table start-stop lever. Correct work speeds are instantly available by merely turning a handwheel. Automatic table reversal with pick feed may be set for any length of stroke from 3/32" to the maximum traverse. Tarry at each end may be independently adjusted from 0 to 5 seconds. For face and bevel grinding the headstock may be swiveled 90 degrees; the lower wheelhead swivel has a range of 90 degrees right and left while the upper swivel has a range of 30 degrees right and left. Table ways are pressure lubricated with filtered oil.

Arter model EG-103 cylindrical grinder

This grinder, made by Arter Grinding Machine Co., Worcester, Mass., is a dual purpose type that can be arranged as a plain cylindrical grinder or as an internal grinder by changing wheelheads. It has hydraulic table movement and hydraulic means for automatic movement of the wheelhead through worm and worm wheel and screw. The work table, wheelhead and headstock can be swiveled for grinding angular work. Face grinding is also possible. Separate wheelhead units are



furnished for internal and external grinding. A wheel dressing attachment with diamond is standard equipment. The hinged head can be swung back to provide wheelhead clearance when grinding. A graduated dial and screw are provided so that the diamond point can be set to act as a gaging device.

Crystal Lake no. 750 plain grinder

This grinder, made by Crystal Lake Grinders, Crystal Lake, Ill., will grind on dead centers from .000030" to .000005" in roundness. This is accomplished by a double taper bearing design having one bearing for radial and thrust load. The high surface finish produced on this grinder is made possible by a spring loaded separate motor drive which breaks motor sine-wave and maintains correct belt tension so as to use full horse power of motor. Belts run at a 90° angle to wheel slides and will not move wheel head.

All wheel spindles are of a double taper, cone bearing design, made of high Manganese tool steel, hardened, "BEST BUY ...

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LEACH 6 X 12 SURFACE GRINDER

HIGH OUTPUT

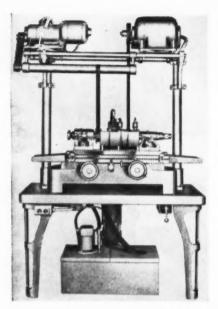
Don't let the low price fool you! The Leach 6 x 12 Surface Grinder is an entirely new engineering triumph that does the BIG jobs. Easily and accurately handles 90% of the work of far more expensive machines. A proven giant money-saver by hundreds of enthusiastic owners. Completely self-contained . . 2-speed ball bearing spindle, driven by a 3/4 HP motor. Nowhere else can you get such high output at such low cost! Write for detailed description.



H. LEACH MACHINERY CO.

387 CHARLES STREET WORLD DISTRIBUTORS

PROVIDENCE 4, R. I., U. S. A.



ground and lapped and run in bronze boxes. The bearings give a combined radial and thrust load which makes grinding in the .00001" possible. The No. 750 plain has water cooled bearings.

Van Norman 418 cylindrical grinder

This 418 cylindrical grinder, made by Van Norman Co., Springfield 7, Mass., was developed for fast precision traverse or plunge grinding of small parts on a production basis. It is adaptable for economical grinding in toolrooms, job shops or plants where work is usually in small or medium runs.

Pope wheel spindle engineered with extra-large SKF double row cylindrical roller bearings. Wheel motor is mounted on adjustable base for belt tension adjustment. Smooth, efficient transmission of power from motor to wheel spindle is provided by 2 V-belts. Step sheaves provide two spindle speeds,



1772 and 2067. A ½ hp motor provides power for table and coolant pump.

The recessed design of the base permits the operator to sit comfortably at the machine, assuring maximum production throughout the day.

Rivett internal and universal hydraulic grinder

The Model 1024, made by Rivett Lathe & Grinder, Inc., Brighton 35, Boston, Mass., combines the special features found separately in an internal grinder



and a plain external grinder. Doubleend wheelhead carries both internal and external spindles and swivels 180° for quick conversion.

Internal spindles available for speeds

from 6,000 to 35,000 r.p.m. Preload of anti-friction bearings on external spindle maintains correct tension without adjustment. Double swivels on cross slide for two-angle grinding. Workhead spindle mounts draw-in col-

lets and step chucks directly. Micrometer stop and fine table feed for shoulder and blind hole grinding. Sine bar for accurately setting swivel of work head or table for taper grinding.

Specifications of late model cylindrical grinding machines

Rivett Lathe & Grinder, Inc.			Brighton 35, Boston, Mass.		
Type and Model	Range In=Internal, dia. Ex=External, dia.	Swing Over Table	Table PT=Power Travel PS=Power Speed	Grinding Wheel	
Universal Grinder No. 84	In=To 3" Ex=Up to 3"x4" long	8"	PT=½" to 4" PS=20 to 80 passes p.m.	7" x ½" face x 1¼" No. 1 Morse	
No. 1024	In=1%" to 9" Ex=10"x18" long	12"	PT = (Hydraulic) 3/6" to 24" PS=(Hydraulic) 3" to 400" p.m.	12"x1½"x5" No. 3 Morse	

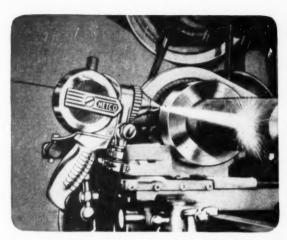
Crystal Lake	Grinders			Crystal Lake, III
Model and Type	Distance Between Centers	ST = Swing Over Table SW = Swing Over Water Guards	C=Collet Capacity H=Hole through Spindle	S=Spindle Speed G=Wheel (Face x dia, x hole)
Precision Cylindrical Grinder No. 500 Plain	8"	ST=5": SW=3"	C=½" 3C; H=&"	$S = \frac{3600}{5};$ $G = \frac{\frac{1}{2}}{2} \frac{\text{"to } \frac{1}{2}}{\text{x} 6} \text{"x} 6 \text{"}$
8" x 10" Universal	10"	ST=8"; SW=41/"	C=½" 3C; H=å"	do
No. 750 Plain	8"	ST = 8" SW = 4½"	C=¾ " 4C; H=% "	S=3000 G=18" to 1" x 7" x 114"
10" x 26" Semi-Universal	16"	ST = 10". SW = 8"	C=1" 5C;	S=2400 G=38" to 1" x 9" x 134"
No. 1000 Universal	18"	ST=10": SW=8"	H=1 &"	do

Arter Grind	ing Machine Co.		,	Worcester, Mass.
Model and Type	Capacity D=Max. Diameter B=Between Center S-Swing over Table	Table TT=Table Travel TS=Table Speeds, hyd. TSW=Table Swivel	Wheelhead WT=Wheelhead Travel WF=Wheelhead Feed WS=Wheelhead Swivel	ing Wheel; WHS=
Cylindrical Grinder Model 103 External	D=3" O.D.; B= 9½"; S=9"	TT= 9½"; TS= 4" to 100" f.p.m.; TSW=5°	WT=3", WF= .0001" to .0005"; WS= 15° right or left	WS=2320 or 2880 r.p.m.; GW=10"x %"x1\dagger" hole: WHS=224.475-600 r.p.m.

incinnati Grind	ers, Inc.	Cincinnati 9, Ol		
Type and Model	S= Swing Over Table D=Distance Between Centers	Infinite Table Traverse Speed, in./min. Headstock and Footstock Centers	F Grinding Wheel	Work Rotation Speeds Grinding Wheel Motor Drive
Universal	S=10H"	3-280	12"x1"x5"	60-600 r.p.m.
Hydraulic 12" Hydraulic	1)=24" S=1248" 1)=(3 sizes) 36", 48", 72"	No. 7 Jame 3-240 for 12" No. 9 B&S	14"x112"x5" 14"x1"x5"	1½ hp. 55-500 r.p.m. 3 hp.
14" and 18"	S=14½" 18∰" D=(3 sizes) 36", 48", 72"	3-220 No. 10 B&S	iller	25-225 or 40-360 r.p.m. 5 hp.
Cylindrical 4"x12" 4"x18" Plain Hydraulic	S=418" D=12" S=478" D=18"	3-280 No. 6 Jarno	16"x1"x8"	175, 290, 480, 800 r.p.m. 2 hp.
6" Plain Hydraulic	S=645" D=(2 lengths) 18", 30"	3-240 No. 10 B&S	24" x2" x12"	97, 165, 225, 395 r.p.m. 7½ hp.
10"L Plain Hydraulic	S=10%" D=(2 lengths) 18", 30"	do	do	66, 111, 173, 268 r.p.m. 7½ hp.
10" and 14"I. Plain Hydraulic	S=10\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	3-220 No. 12 B&S	30"x3"x12"	76-292, 62-2-7, or 46-172 r.p.m. 15 hp.
14" Plain Hydraulic	S=14\%" D=(7 lengths) 36", 48", 72", 96", 120", 144", 168"	3-120 No. 13 B&S	30"x2"x20"	40-144 r.p.m. 20 hp.
16" Plain Hydraulic	S=17" D=(7 lengths) 36", 48", 72", 96", 120", 144", 168"	do	do	20-72 r.p.m. 20 hp.
16", 20", 24" Plain Heavy Duty	S=16½" 21", 24¼" D= 48", 72", 96", 120", 144", 168", 192", 216", 240"	3-120 No. 15 B&S	30"x3"x20"	16"=20-72 20"=15-54 24"=14-51 20 hp.
Micro-Centric No. 1	Manual fixture == %-3½" dia. Auto. fixture == %-3½" dia.	Wheelhead rapid advance stroke = 0.1%" Grinding stroke = 0.5%"	Grinding rate adjustment = .005"-1 in./min. Wheel = 20"x½" to 1"x12"	3 hp.
No. 2	Manual fixture= 2-8" dia. Auto. fixture= 2-4" dia.	do	Grinding rate adjustment= .005"-1 in./min. Wheel= 20"x½" to 2"x12"	7½ hp.

Van Norman Co.			Springfield 7, Mas	
Model and Type	Capacity B=Dist. Between Centers; S= Swing	Traverse Speed	Grinding Wheel and Taper in Spindle	W=Work Speeds SS=Wheel Spindle Speeds
Grinder No. 418	B=18"; S= 4 &"	(6) 6 to 100 i.p.m.		W=(4) 153 to 946 SS=1772 & 2067

266



now a really low-cost metallizing installation...

with the new Metco L-Gun





a up worn broke-drum



Metallizing protective coating on steel plate

New, low, compressed-air requirements . . . only 10 cfm at 40 to 60 psi, already available in many shops, or supplied by inexpensive 3 hp compressor . . . bring metallizing within reach of the small user.

Here's a chance for the smaller maintenance shop to get into profitable metallizing operations like these:

- Save up to 90% of replacement costs on machine repair jobs,
- Do your own hard-facing,
- Apply long-wearing corrosion-resistant coatings to exterior plant structures, tanks and other equipment.

Sprays 23 Different Metallizing Wires-With the new L-Gun you can spray .10, 25, .80 carbon steels, stainless; babbitts, brass, bronze, nickel, aluminum, tin, zinc; special hard-facing materials such as Metco-Weld H, and the new selfbonding Sprabond wire.

H's Vorsutile - Use the L-Gun machinemounted or hand-held-it weighs only 4 lb. 2 oz. Do all kinds of metallizing work - shaft and bore build-up with harder, longer wearing metals, build up worn pump plungers, crankshafts, motor shafts; apply corrosion-resistant coatings. There are hundreds of different jobs that are "naturals" for metallizing.

Same High Quality as Other Metco Guns-The low air requirements of the new L-Gun have been achieved without any

sacrifice in Metco quality. It embodies new developments in turbine and nozzle construction - is built, like all Metco guns, for rugged, dependable service.

A Real Opportunity for the Smaller Shop Thousands of large, well-known companies have been metallizing users for many years, not only in maintenance but in production applications on original equipment. Now, with the development of the new L-Gun, and a low cost installation, metallizing is within the reach of even the smallest plant. (We'll be glad to send you the names of some Metco users-large and small.)

Free Bulletin or Shop Demonstration-Send off the coupon for the detailed information Bulletin 55 gives you. Or, better still, ask for a demonstration in your own shop by a Metco Field Engineer. He'll be glad to show you how the new Metco L-Gun works on some job of your own No obligation, of course



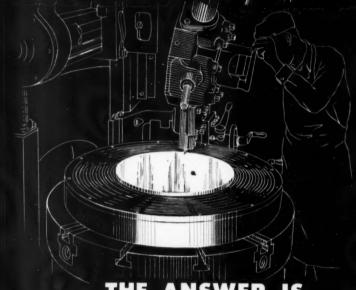
See other examples of metallizing illustrated in our 8-page Pulletin in your Sweet's Plant Engineering File-Section 7a/Me. The following names are the property of Metallizing Engineering Co., Inc.

METCOT · Sprabond wire · Metco-Weld

METALLIZING ENGINEERING CO., INC. 38-14 30th STREET LONG ISLAND CITY 1, N. Y. Don F. Wetson METALLIZING ENGINEERING CO., INC. 38-14 30th Street Long Island City, New York

orton Compo		T=Table Speeds,	1	rcester 6, Mas
Model and Type	Capacity R=Dia. Range C=Langth Between Centers	Hydraulic R=Range, per Minute	G=Grinding Wheel H=Headstock Center Dia.	Swivel Table Adjustment, Inches per Foot
Cylindrical				
Grinder				
4" Type CTU	R=4"	T=Infinite	G=16"x1"x8"	514" for 12" 41/2" for 18"
Semiautomatic	C=(Two sizes) 12" and 18"	R=2 to 240	H=%"	41/2" for 18"
or plain	12" and 18"			
6" Type CTU	R=6"		G=24"x2"x12" H=114"	4" for 18" 3" for 30"
Semiautomatic	C=(Two sizes) 18" and 30"	do	H=1%"	3" for 30"
or Plain				
10" Type CTU	R=10"		G=30"x3"x12"	31/2" for 18"
Semiautomatic	C=(6 sizes) 18", 36", 48", 72", 96", 120"	do	H=1%"	21/2" for 36"
or Plain	18", 36", 48".			2" for 48"
	72", 96", 120"			1 1/2" for 72"
				2½" for 36" 2½" for 36" 2" for 48" 1½" for 72" 1¼" for 96" 1" for 120"
				1" for 120"
Angular				
Wheelslide				
Grinder				
6"x18"	- · · ·	W 1 0 1	G=24"x2"x12"	4"
O X19	R=6" C=18"	T=Infinite R=3 to 360	H=11/4"	4
10# 10#	C=10	The second secon	6 - 20" - 2" - 12"	21/2"
10"x36"	R=10" C=36"	do	G=30"x3"x12" H=1%"	272
	C=36		11-1-4	
Cylindrical				
Grinder				
14" and 16"	R=14" and 16"	T=Table Speeds,	G=30"x3"x12"	3 % for 36"
Type C	C=(7 sizes) 36", 48", 72", 96", 120", 140", 168"	Hydraulic	H=2"	215" for 48"
	36", 48", 72", 96",	3 to 240		21/4" for 72"
	120", 140", 168"	(lengths to 120" only)		1 #1" for 96"
		Mechanical,		1 m for 120"
		6 to 92, all lengths		1 %" for 120" 1 %" for 144" 1 %" for 168"
18", 24", 30"	R=18", 24" and 30"	att tengens	G=30"x3"x12"	3%" for 48"
Type C-2	G=(6 viage)		H=21/2"	23/ " 6 72"
Semiautomatic	48" 72" 96"		11-2/2	2%" for 96"
or Plain	C=(6 sizes) 48", 72", 96", 120", 144", 168"			2%" for 72" 2%" for 96" 2" for 120"
91 1 111111	120 1 111 1 100			136" for 144"
				1%" for 144" 1%" for 168"
20" to 36"	R = 20" 24"	T=6 to 84	G=30"x3"x12"	2%" for 96"
Type D	R=20", 24", 28", 32", 36"		H=3" for 20" and 24"	2%" for 120"
Traversing	C=(5 sizes)		20" and 24"	2" for 144"
Work Table	96", 120", 144",		41/2" for 28", 32", 36"	1%" for 168"
	C=(5 sizes) 96", 120", 144", 168", 192"			2%" for 96" 2%" for 120" 2" for 144" 1%" for 168" 1%" for 192"
Roll				
Grinder				
36" Type D	R=36"	R=3 to 105	G=30"x3"x12"	
Traveling	C-(6 sizes)	K-3 10 103	H=41/2"	
Wheel	120" 144" 168"		11-178	
W HEET	120", 144", 168", 192", 216", 240"			
C				
Cam				
Grinder				
No. 2	Swing=5"		G=24xWx18	
	Lift of cam =		(Width to suit cam)	
	1% dia.	1		
	Lift of cam = 1%" dia. C=(3 sizes) 26", 30", 40"			
	20 , 30 , 70			
Universal				
Grinder				
10" x20"	R=10"	T=Infinite	Wheelhead	3"
	C=20"	R=3 to 144	Swivels 360°	
			Headstock Swivels 360°	
	100 100 100	W-1 2		29/ 6/ 2 2 2 2
12", 14", 16"	R=12", 14", 16" C=(3 sizes) 36", 48", 72"	T=Infinite R=7 to 144	do	2%" for 36" 2%" for 48" 1%" for 72"
Type C				

CHUCKING PROBLEMS?



ANSWER

Mayna-LOCK CHUCKS



Rectangular . . . rotary . . . swiveling. Wide range of sizes and voltages. 22% more magnetic area ... pieces held to extreme edges of chuck. Moisture-proof. Exclusive all-steel construction. Many other advantages.



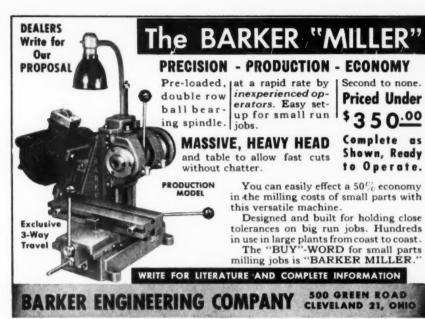
Hanchett MAGNA-LOCK CORPORATION

Magnetic Chucks and Devices

BIG RAPIDS

MICHIGAN, U. S. A.

andis Tool Co. Waynesboro,				
Model and Type	Capacity S=Swing D=Dist. Between Centers	Carriage T=Traverse Speed in./min. TP=Taper in. per ft.	Grinding Wheel Headstock and Tailstock Cen ers	Range of Work Speeds and Horsepower (Wheeldrive)
Cylindrical				
Grinder seneral Purpose	S=12%" D=28"	T=12-23-43-85 TP=5"	12"x%"x3" No. 6 Jarno	85 to 483 1 hp.
Universal 10"x20" Hydraulic	S=10%" D=20"	T=3" to 120" TP=3"	10"x½"x3" No. 6 Jarno	90 to 600 I hp.
10"x24" Type CH	S=10%" D=24"	T=3" to 144"	12"x1¼"x5" No. 6 Jarno	55 to 495 1½ hp.
12"x36" 12"x48" Type CH	S=12%" D=36" and 48"	do	14"x1½"x5" No. 9 Jarno	60 to 360 3 hp.
14" Type C Hydraulic	S=14" D=(3 sizes) 36", 48", 72"	do	do	60 to 360 5 hp.
18" Type C Hydraulic	S=18" D=(3 sizes) 36", 48", 72"	do	do	12 to 360 5 hp.
30", 36", 48" Type CHW	S=30", 36", 48" D=48", 72", 96", 120"	T=3" to 130"	18" x2" x5" Am. std. 8" type A-2	8 to 96 7½ hp.
4" Type H Plain	S=4-31/32" D=12", 18"	T=3" to 120" TP=3%"	16"x1"x8" No. 6 Jarno	200 to 900 3 hp.
6" Type CH Plain	S=65%" D=18", 30"	T=3" to 360" TP=3½" for 18", 2%" for 30"	24" x2" x12" No. 9 Jarno	95-153-246-400 7½ hp.
Type LCH Plain	S=10%" D=18", 30"	do	do	do
Type CH Plain	S=10%" D=(6 sizes) 18", 36", 48", 72", 96", 120"	T=3" to 240" for 18", 36", 48", 72"; 3" to 130" for 96", 120" TP=3", 2½", 18, " + ½, " 1", 5, "	30"x3"x12" No. 14 Jarno	54-76-107-150 or 40 to 330 (DC Drive) 10 or 15 hp.
Type CH Plain	S=14%" D=do	do	do	do
Type DC Plain Hydraulic	S=10%" D=36", 48", 72"	T=3" to 240" FP=1½", 1%", 1¼"	do	50 to 135 20 or 25 hp.
30", 36", 48" Type CHW Plain	S=30", 36", 42", 48" D=48", 72", 96", 120"	T=3" to 130"	30"x3"x12" No. 16 Jarno	10 to 40 25 to 100 10 or 15 bp.
20", 24", 28" Type B Plain Hydraulic	S=20", 24", 28" D=98", 122", 146", 170", 194"	T=4" to 100"	3()"x3"x12"	12 to 100 30 hp.
Chucking Grinder Type H	S=6", will grind max. dia. of 11/2"	Wheel feed movement, hand, 6 1/2" hydraulic, 3"	16" dia. x	440 to 800 2 hp.





MODEL No. 612

Grinds 6" x 12"

—by 15" height over

Standard chuck with 8" wheel.

Available with either

Double Taper or

Ball Bearing designed

Spindles.

CRYSTAL LAKE GRINDERS

Since 1910 Crystal Lake, Illinois



Here's the latest addition to the expanding line of Duro high speed production drill presses. These new 15½" drill presses now enable you to make up your own drill press combinations in 1, 2, 3, or 4 spindle set-ups. Gives you a continuous production line, eliminates transferring between machines and provides maximum working surface on long, heavy work. Precision machined, accurate, each unit incorporates the most modern improvements and features for most economical operation and faster, cost-cutting production. The entire Duro line **now** includes **32 models** in **3 sizes** with a "just-right" drill press for every job.

Here are a few features:

Ball bearing equipped; 0 to ½" chuck capacity; 4¾" spindle travel; 9 splined spindle; improved Jacobs "safe-lock" Chuck which prevents chuck from flying off spindle; simple quill tension adjustment and wear compensating adjustment; rigid 2¾" dia. steel column; double support motor mount; positive depth stop, adjustable depth gauge; built in switches for light and power; plus many other features.

Write for FREE Brochure



chock-full of facts and figures on the complete line of Duro drill presses, detailed construction features, plus available attachments and accessories. Find out how you can adapt a DURO to your specific production set-up. Duro Metal Products Co.

2689 NORTH KILDARE AVENUE
CHICAGO 39, ILLINOIS

WORLD'S LARGEST MANUFACTURERS OF POWER AND HAND TOOLS (DURO-CHROME)

NOW-PRECISION TAPPING FOR LARGE, BULKY PARTS!



Warner & Swasey No. 11R Radial Tapping and Threading Machine. Available with single or dual, independently-operated, tapping heads.

EXTREME VERSATILITY plus the positive threading accuracy of Warner & Swasey's exclusive lead-screw principle are combined in the No. 11R Precision Tapping and Threading Machine. Here's one machine that handles Class 3 and 4 tapping on a production scale—in a wide range of materials—on bulky parts as well as smaller ones. Tapping heads swing to the work—push button control raises and lowers columns. It's simple to set up and operate—a machine you can count on to reduce scrap loss, cut costs.

THREE CONVENIENT WORK SURFACES, AND TWO COMPLETELY INDEPENDENT TAPPING MEADS, MAKE MANY COMMIN-KTIONS POSSIBLE ON THE NO. 11R DUAL RADIAL.



Extra long work pieces can be let into pits at rear and left end of machine.



One piece can be mounted on left end, another on top of base — or both on top.



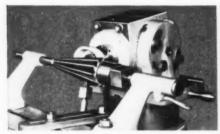
Rear vertical wark surface and top of base can be used at same time.

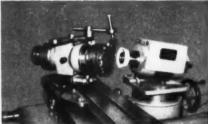


YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY MACHINE TOOLS, TEXTILE MACHINERY, CONSTRUCTION MACHINERY.

Specify THIS NEW POPE SUPER PRECISION 1 HP, 3600 RPM MOTORIZED TCOL AND CUTTER GRINDER CLEARANCE ANGLE SWIVELLING HEAD

With Angular Adjustment In A Vertical Plane





TIME AND MONEY SAVING FEATURES:

- Cup wheels, generally considered best for cutter grinding, can be used for practically all clearance angles on this new head.
- 2. Cup wheels produce a cutting edge on tools that lasts longer because it is stronger.
- The tooth rest remains on the center line of the cutter for practically all grinding on centers or in the work head.
- Most cutters and reamers can be ground all over with one set-up, using the swivelling table and Pope tilting head. The usual second and third set-ups are no longer required.
- All clearance angles read directly in degrees from the scale provided on the head.
 Mistakes on clearance angles are avoided.
- The right clearance angle is assured on tools difficult to grind, such as slab mills, taper reamers, angular cutters and form tools.
- 3600 R.P.M. one wheel speed safe for all wheels generally used on cutter grinders. Heat checking of cutters is virtually eliminated.
- The operating ease and convenience of this new Pope Head with the angular adjustment in the vertical plane saves you time and money on every tool you grind.

ASK FOR COMPLETE SPECIFICATIONS

No. 96

Specify POPE
PRECISION SPINDLES

POPE MACHINERY CORPORATION

361 BYER STREET . HAVERHILL, MASSACHUSETTS

Shop HINTS



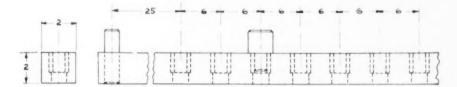
Master Bar Speeds Measuring of Larger Dimensions

by Edward V. Lange

TO MEASURE distances from two to ten feet accurate within a few thousandths, the average shop can set up a low budget measuring kit by using their standard set of precision measuring blocks ("Jo-blocks") in conjunction with a large type inside micrometer (with a set of standard extension rods) and the master bar as pictured here.

It is commonly known that inside micrometers, especially if used with long extension rods, cannot be relied few shops carry outside micrometers beyond the ten- or twelve-inch size, we made a master checking or setting bar out of a ten-foot-long, two-inchsquare steel bar of SAE 1045 quality.

On the jig borer, we bored seventeen holes with spacings as shown on the sketch. A stationary pin, as a reference point, was pressed into the first hole and standard purchased drill bushings were pressed into the other holes. A movable slip-fitted pin serves as the

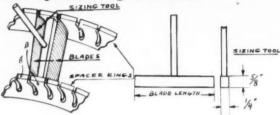


upon to give highly accurate direct readings. The common practice, therefore, is either to set inside micrometers with regular micrometers or to check the readings of inside micrometers with regular micrometers. Since, however, second reference point. By using these two reference points in conjunction with a combination of "Jo-blocks," the inside micrometer can be set (or checked) with a comparatively high degree of accuracy.

Sizing tool overcomes spacer ring distortion

A sizing tool designed by Erick Nimmer, Allis-Chalmers employe, has proven effective in overcoming distortion or buckling of spacer rings when clamping blades into steam turbine diaphragms.

As the spacer rings
were hammered and crimped (at point
A in the sketch) to clamp the blade,
they would bend outward at point B.
To prevent this, a sizing tool several
thousandths of an inch longer than the
blade was made for each blade length
encountered.



The tool is placed between two adjacent blades and prevents spacer ring radial bending during crimping. Upon removal of the slightly oversize tool, the spacer ring section springs into almost perfect alignment.

Pin arbor

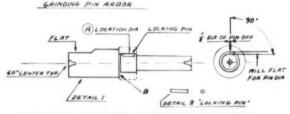
In turning and grinding, arbors always seem to present a problem. That is to say, arbors that will hold concentricity and squareness; arbors that can be quickly loaded and unloaded.

In many operations the pin arbor is the answer. With no screws, studs, or washers to put on and take off, pro-

duction will increase from two to five

It is simple to make. It takes a part into location as quickly as a tapered arbor and locks that part securely for machining.

To locate a part on a pin arbor, the part is located on dia. "A" and banked against face "B." A simple twist of the wrist clockwise and the locating pin secures part to arbor. Held in this position excentricity cannot exceed the



DIR R. TO BE CONCENTRICTO CENTERS WITHIN . 0002 F.I.R.
T.S. MARDEN & GR.

allowed tolerance of the bore of part to be machined. Facing ends of part on this arbor will insure dead squareness to the bore.

To remove part from arbor, the part is turned counterclockwise to release locking pin. (Note: A spot of grease in pin groove will keep pin from falling out when part is removed.)

In processing parts for pin arbor operation, the bore should be held to close tolerances for manufacturing purposes.

Salvaging by heating

Occasionally, a large and costly casting, weldment or bar is rejected by inspectors because of a reamed hole that is slightly oversize, out of round, or tapered.

Rather than reboring and rebushing

as is often done to salvage such work (and at times such bushing is not permitted because of functional limitations) a simple heating operation by hand torch or furnace shrinks the hole sufficiently to permit another reaming and correcting operation.

Sharpening carbide masonry drills

Four steps to sharpening carbide tipped masonry drills have been outlined by the Carboloy Dept. of General Electric Co., Detroit, Mich.

The department recommends using a silicon carbide wheel for use in resharpening the drills and restoring the

varies in size, the drill will make oversized cuts. (4) Repeated sharpening of the drill will reduce the clearance between the carbide tip and the steel shank. When necessary, grind away steel from behind the carbide tip so the steel is nowhere closer than 1/32"

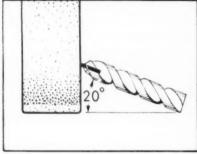


Fig.1 -

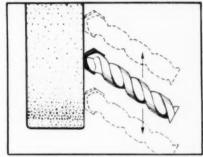


Fig.2

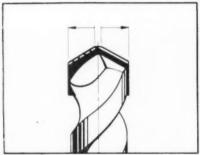


Fig. 3

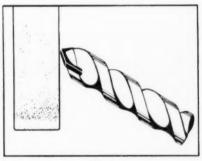


Fig.4

original 118° included angle. The drills should be sharpened when a 1/64" or more flat develops on the cutting edge. The steps: (1) Bring the drill against the side of the grinding wheel at a 20° angle as shown in Fig. 1. This 20° angle should be maintained, otherwise the drill will not cut properly. (2) Using moderate pressure, move the drill back and forth across the wheel to avoid overheating (Fig. 2). (If overheating should occur, do not drop the drill into liquids to cool.) (3) Keep the two cutting edges of the drill of equal length while sharpening (Fig. 3). If one edge

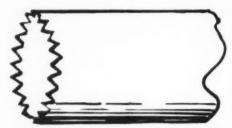
to the working surface of the carbide blank, (Fig. 4).

How to drill a hole through glass

by W. F. Schaphorst, M.E.

Use a copper or brass tube of the size of hole desired. Or, if you have a lathe, turn down a brass or copper rod, making it hollow or tube-like in shape at the end, and of the desired diameter. If the brass is hard, anneal it by heating and plunging in water.

File small teeth in the end, some-



thing like saw teeth, for holding the abrasive material. Of course, copper teeth cannot cut glass as copper is much softer.

Place the tube in a vertical drill press and carefully rest the glass on an old magazine, soft pad of paper, leather, felt, or rubber, etc.—anything that will not strain the glass.

Do not attempt to do the work quickly. Be gentle and painstaking about it. Be patient.

Use three parts of turpentine and one part of ether as a lubricant. If no ether is available, turpentine may be used alone but the combination of the two is much better.

Run the drill at a speed of 15 to 30 r.p.m., slowly and without much pressure.

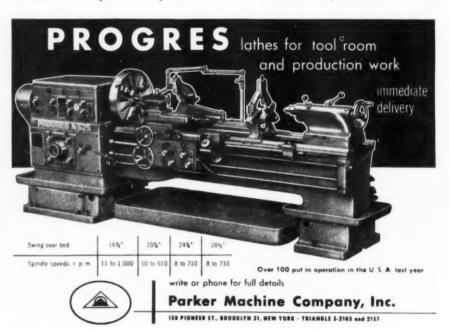
Should you want to ream the hole a little larger, it can be done by using a three cornered file that will go into the hole but not through it, as such files are tapered. Use the same lubricant. When the hole is of the right size on one side of the glass, turn the glass over and ream from the other side.

Double equalizing clamp

by Roger Isetts

On jigs and fixtures the illustrated clamping arrangement can be used advantageously in many instances. It can be used as a double clamp for two pieces at once and will equalize clamping pressures even on rough variable stock. In addition, it is simply constructed and yet will exert a powerful clamping pressure.

A bar made of cold-rolled is reamed in the center a slip fit for a shoulder



This man is running SIX drift

He is performing six consecutive drilling operations with a single jig at a single working station, with less handling time, and without changing tools. He is using the Lignormatic turret on a standard drill press.



PUT THE LIGN-O-MATIC TURRET IN YOUR SHOP FOR A FREE 10-DAY TRIAL . . . IT WILL . . .

INCREASE PRODUCTION — Many users report more than 300% greater output in actual production. Turret indexes faster than tools can be changed or work moved to another spindle.

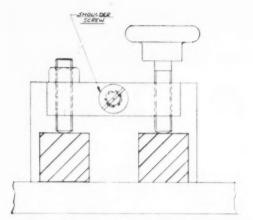
CUT COSTS — patented self-centering principle guarantees accuracy equal to drill press spindle. Lign-o-matic

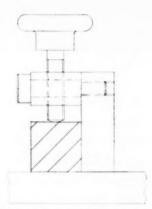
reduces tool and jig wear, cuts worker fatigue: adds up to faster work with fewer rejects. All parts completely guaranteed for TWO YEARS against defective manufacture.

PRICE — Model D, 6 spindles with No. 2 Jacobs male taper \$235.00 DELIVERY — Currently, 2 weeks.

TRY IT YOURSELF at our expense. If you are not fully satisfied for *any* reason, return turret within 10 days and pay nothing.

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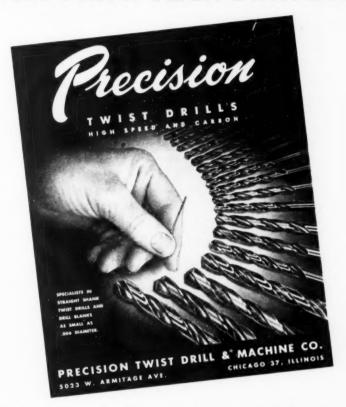


screw which serves as a pivot. Two holes are tapped in each end—one for a setscrew and lock nut and the other for a handknob.

Just by tightening the handknob in a single action, both pieces will be clamped securely.



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"Any Precision made drill or tool must not only be entirely satisfactory to you, but must prove to be the most economical you have ever used or it can be returned for full credit."

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T. E. Wardrope Agency, 10014 Euclid Ave.—CLEVELAND 6, OHIO
Tool Products Co., 320 Park Ave.—DALLAS 1, TEXAS
H. D. Geisler Co., 321 Park Ave.—DALLAS 1, TEXAS
H. D. Geisler Co., 2715 Salem Ave.—DALTON 6, OHIO
Art Lewis Product Equipment Co., 422 Magnolia Ave.—GLENDALE 4, CAILF.
Standard Die Supply, 26 E. McCarty St.—INDIANAPOLIS 25, IND.
Ernst Machine, 1606 Oak St.—KANSAS CITY 8, MO.
Pinhead Co., 38 Village Dr.—LIVINGSTON, N. J.
Bell-Well Sales Co., 1323 N. Water St.—MILWAUKEE 2, WIS.
Mfgrs. Service Supply, 242 Tauton Ave.—E. PROVIDENCE, R. I.
Roessel & Co., 683 Hudson Ave.—ROCHESTER 21, N. Y.
H. F. Soderling Co., 1745 4th Ave. South—SEATTLE 4, WASH.
Hub City Factory & Mill Supply Co., 213 James St.—SYRACUSE 6, N. Y.
Midwest Die & Supply Co., 1671 Fernwood Ave.—TOLEDO, OHIO
Cummings & Co., 115 E. Lewis St.—WICHITA 2, KANSAS

Detroit 19, Mich.

Catalogs, bulletins available from manufacturers

- 1. Diamonds of every description, diamond products, services, descriptions, illustrations, and much general information in this field will be found in the latest 68 page booklet from Ralph Watkins International Trade, 2251 75th St., Dept. BB, Chicago 49, Ill.
- 2. Felt swatches of 47 reference samples, divided into three classes, 16 types of mechanical roll felts, 18 types of sheet felts, and 13 types of roll felts for the apparel and decorative trades, are included with a catalog issued by American Felt Co., Dept. BB, Glenville, Com.
- 3. Knurling tools of the self-closing type, sizes, dimensions and prices are shown in a supplementary bulletin published by Barnaby Mfg. Co., Inc., 74 Knowlton St., Dept. BB, Bridgeport 8, Conn.
- 4. Lustrex X-820, a carboxyl-containing polyelectrolyte resin, with fields of application including latex paints, inks, pigment dispersions, ceramic glazes, emulsions, topcoats, etc., is described in a bulletin from Plastics Division. Monsanto Chemical Co., Dept. BB, Springfield, Mass.

- 5. Rotor tool maintenance plan to make air tools produce more "Keep 'em Cutting," containing valuable information for the care and handling of airpowered portable tools; available from The Rotor Tool Co., Dept. BB, Cleveland, Ohio.
- 6. "Hydraulic Fluid Line Tubing." a 4-page bulletin just issued by Joseph T. Ryerson & Son, Inc., Dept. BB, Box 8000-A, Chicago 80, Ill., includes recommended practice for industrial equipment, analysis and description of cold drawn seamless steel hydraulic tubing, and table of sizes and calculated bursting pressures of steel tubing.
- 7. Cutting tool specialists, Sid Tool Co., Inc., Dept. BB, 126 Lafayette St., New York 13, N.Y., just issued two new catalogs covering precision lathes, centers, etchers, demagnetizers, cutting tools, collets, angle plates, tappers, indexing devices, grinders, vises, boring heads, attachments, etc.
- 8. Broaching machines, heavy duty horizontal hydraulic, manufactured by American Broach and Machine Co., Dept. BB, Ann Arbor, Mich., are ex-



JEVIN Jewelers type lathes for fine instrument work and second operations. Collets as small as .004". Send for catalog. Louis Levin & Son, Inc., 782 E. Pico Blvd., Los Angeles 21.



plained in Circular 502, showing features and applications.

9. "Cutting-Off Wheels," a new booklet, has just been published by The Grinding Wheel Institute, Dept. BB, 2130 Keith Bldg., Cleveland 15, Ohio. It is full of technical and general information on this subject, and is profusely illustrated.

10. "Trade, Tariff Policy . . ." of the U.S.; 78 pages covering problems, im-

ports, exports and economy; reciprocal trade; foreign policies to trade; inability of world to buy, etc. Write Superintendent of Documents, Government Printing Office, Washington 25, D.C.

11. Preheat calculator of Lincoln Electric Co., Dept. BB, Cleveland 17, Ohio, using slide rule principle, quickly determines preheat temperature required when welding hardenable steels; calculates preheat in simple steps based on chemical analysis and thickness; also

Fiske "Magic" Compound

A Water Soluble Cutting Coolant

Fiske "MAGIC" Compound, when dissolved in water, cools, lubricates, produces a high finish and lengthens tool life. There is nothing else like it for milling, drilling, grinding, turning, sawing, threading, wire drawing and stamping. It is rust resistant, stays mixed and will not become rancid. Try it and see the improvement in your work.

There is a Fiske Lubricant for every metal working operation. Each is an outstanding product and results in more production, better finish and increased tool life. Complete literature available. Write today to Fiske Brothers Refining Co., 121 Lockwood St., Newark 5, N. J., or 1502 Oakdale Avenue, Toledo 5, Ohio.



METAL WORKING LUBRICANTS

issued recently, a 50 page booklet presenting life stories of 26 people and companies who have gained "Success Through Welding," without handouts. Books are 50c each.

12. Tool inventory—a how-to booklet designed to show toolroom supervisors and managers how they can reduce carbide tool inventories—is available from Carboloy, Department of General Electric Co., Dept. BB, Detroit 32, Mich.

13. Inclinable presses equipped with mechanical sleeve clutches, made by Niagara Machine & Tool Works, Dept. BB, 637-697 Northland Ave., Buffalo 11, N.Y., are described and shown in catalog No. 58L.

14. Resistance welding's history can be traced in the bibliography, RWMA bulletin No. 17, available from Resistance Welder Manufacturers Ass'n., Dept. BB, 1900 Arch St., Philadelphia 3, Pa. \$1.25.

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ROLL FEEDS

FITS ANY PRESS... bench or pedestal type high speed power presses. For side or rear feeding. Furnished complete with adjusting disc, mounting bracket and connecting linkage.

CAN'T SLIP . . . each wedge has 4 points of contact to safeguard accuracy.

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FEEDS IN THOUSANDS... RFC Roll Feeds assure amazingly accurately stock movement.

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EARLY

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15. Drilling machines with 8-12-15 overhang, sensitive and power feed, one to six spindles are described in Bulletin 2730-G, Buffalo Forge Co., Dept. BB, Buffalo, N.Y.

16. Horizontal milling machine No. 3, made by Van Norman Co., Dept. BB, Springfield 7, Mass., featuring such improvements as built-in spindle flywheel, spindle transmission with wider faced gears and larger tooth area, front

and rear controls, feed selector—single lever, ram type overarm, and universal saddle is explained in their newest bulletin.

17. Solid adjustable blade reamers, carbide tipped if required, manufactured by John M. Rogers Tool Co., Dept. BB, Gloucester City, N.J., are fully described and illustrated in a recent bulletin. By driving blades along the inclined plane, the cutting edges can be



HERE'S WHY... 2 or 3 solid-brazed face mills cost less than 1 inserted blade type! The same initial investment provides 1 or 2 spare cutters which can be used for production while grinding the original.

There's less chance of damaging rugged, one-piece solid-brased type cutters. No moving parts to keep aligned! . . . No loose parts to shatter, to injure workers when accidents occur.

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Solid-brazed cutters can be repaired quickly when damaged — No costly machined body to be re-worked or replaced. I blade for an inserted type cutter costs as much as 3 to 5 replaceable solid carbide cutter tips. The selid-type face mill has up to twice as much usable carbide. THEREFORE — SOLID-BRAZED FACE MILLS GIVE YOU — MUCH LOWER INITIAL COST — LOWER MAINTENANCE COST — FASTER PRODUCTION — CLOSER TOLERANCES — GREATER SAFETY and LESS DOWN TIME!



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expanded to compensate for wear, then reground to size. The blades, being interchangeable, are removed when worn to the limit of adjustment and new ones inserted.

18. Bending machines for pipe, conduit and tube, made by American Pipe Bending Machine Co., Dept. BB, 15 Furnace St., Poultney, Vt., in both hand and motored powered types, and also combination bending tables, are shown in their latest folder.

19. Planetary milling machines, numerous applications and setups, planathreading applications and combinations are shown and described in a bulletin distributed by Del-Val Sales Co., Dept. BB, 5823 Greene St., Philadelphia 44, Pa.

20. Air cylinders and air cylinder hoists made by Lehigh Foundries, Inc., Dept. BB, 1500 Lehigh Drive, Easton, Pa., are featured in a data sheet and recent bulletin.

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28 YEARS OF QUALITY CONSTRUCTION



21. Supercast segments and chuck assemblies are shown in folder along with grinding facts and applications by Robertson Mfg. Co., Dept. BB, Trenton 5, N.J.

22. Diamond tools, specifications and applications, diamond products, descriptions, services, profuse illustrations and general information will be found in the latest catalog by Maurice S. Dessau Co., Inc., Dept. BB, 53 Fifth Ave., New York 17, N.Y.

23. Shear knife handbook is intended as a guide for the selection of grades of shear knives and slitter knives to be used in various applications; also gives suggestions as to the care and proper operation of shear and slitter knives. American Shear Knife Co., Dept. BB, Homestead, Pa.

24. Single crank straight side presses, Series S1, and double crank straight side presses, Series S2, made by the Minster Machine Co., Dept. BB, Minster, Ohio, are described and illustrated in two brochures recently published by the company.

25. "Corrosion Resistance of Copper and Copper Alloys," publication B-36R of The American Brass Co., Dept. BB, 25

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Broadway, New York 4, N.Y., explains the chemical and physical nature of corrosive attack in its various forms. Stress corrosion, cracking, galvanic corrosion, fresh and salt water corrosion have also been discussed.

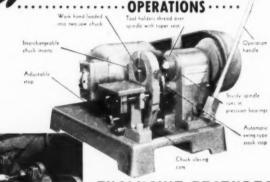
26. "Engineering Data on Thread and Form Rolling," is a very comprehensive book providing a source of technical

information on thread and form rolling for design and process engineers and those actively engaged in the application of the thread rolling process. Reed Thread Die Co., Dept. BB, Box 350, Worcester 1, Mass.

27. Grooving tool, 20-page descriptive catalog, including facts, figures, charts and illustrations to demonstrate how



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At Kold-Hold Mlg. Co., two Pines Air-Operated Machines with single foot control speed tube deburring and facing operations. One operator groduces 1200 tube ends per hour. EXCLUSIVE FEATURES

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698 WALNUT . AURORA, ILLINOIS

the equipment can be employed to best advantage, published by Waldes Kohinoor, Inc., Dept. BB, 47-16 Austel Place, Long Island City 1, N.Y.

28. Profile milling machine for high spindle speed and high feed nonferrous metal milling, the Onsrud Model A-72 Invomill, is featured in a new 16 page bulletin just published by Onsrud Machine Works, Inc., Dept. BB, 3900 Palmer St., Chicago 47, Ill.

29. Engineering data form to guide center users and an outline of engineering information regarding centers is included in an engineering data sheet obtainable from The Ready Tool Co., Dept. BB, 554 Iranistan Ave., Bridgeport 5, Conn.

30. Toolholder. A four-page circular, No. KL-53, which describes their new style toolholder, is announced by the Metal Carbides Corp., Dept. BB,

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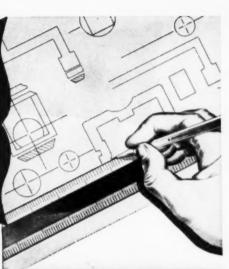
Thorough inspection of this 10 station progressive die for producing clips to link 60 caliber machine gun shells insures minimum time from production line to battle line. PRODUC-TION PROVING from 10 to 50,000 pieces from the die guarantees "proving ground" quality like this -







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THE B. JAHN MANUFACTURING COMPANY, NEW BRITAIN, CONNECTICUT

Youngstown, Ohio. This toolholder is said to utilize standard carbide blanks and mechanically clamps same to the toolholder in a horizontal position.

31. Rotary stock stops, floating holders, tap holders and hinged shoe bushing blanks are catalogued in brochure issued by Barnaby Mfg. Co., Inc., Dept. BB, 74 Knowlton St., Bridgeport 8, Conn. Specifications, sizes and prices are tabulated. Tools are illustrated.

32. Flexible couplings, and the "Junior" gear coupling are covered in bulletins by the John Waldron Corp., Dept. BB, New Brunswick, N.J. Photographs, diagrams, specs tables, directions for size selection, service factors and method of computing coupling capacity are included.

33. Vises, rotary tables. An illustrated



There's a Gusher to fit almost any requirement as to type of intake, discharge, position on your machine, and pumping capacity.

Choose between immersed type, outside mounted pipe connected, flange mounted with external or internal discharge in capacities up to 200 G.P.M., Motor (1/30 to 2 HP). Also, shaft, and belt driven models are available. Write today.

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bulletin giving complete specifications on a line of multiangle universal vises, toolmakers' vises, vee blocks and precision rotary tables, all imported from England, is available from De Witt Equipment Co., 136 Lafayette St., New York 13, N.Y.

34. Turret lathe. With complete specifications and explanative copy, Catalog No. 5312 of the South Bend Lathe Works, Dept. BB, 425 E. Madison St., South Bend 22, Ind., provides four full

pages on the production turret lathe.

35. Radial drills, product of Morris Machine Tool Co., 937 Harriet St., Cincinnati 3, Ohio, are featured in an illustrated 16-page booklet. Supplies foundation plans, dimensions and specifications for the 11" column 3, 4, 5 and 6 foot arm Mor-Speed radial drills. Other machines for multiple drilling, reaming, tapping, boring and similar operations are illustrated and briefly described.



36. Power for electrolytic processes, specialty transformers. Various methods of obtaining d-c power for electrolytic processes are described in a new 16-page booklet (B-5466) available from the Westinghouse Electric Corp., Dept. BB, 401 Liberty Ave., Box 2278, Pittsburgh 30, Pa. Booklet B-5806, from the same source, gives details of transformer characteristics and construction and discusses specialty trasformers that can be built from basic components to fit specific requirements.

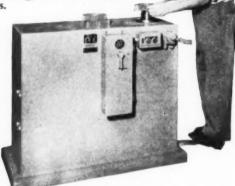
37. Portable strain indicator. Bulletin 4103 describes SR-4 portable strain indicator, the Type MA, with self-contained a.c. power pack mounted inside the instrument case. Copies may be obtained from Baldwin-Lima-Hamilton Corp., Dept. BB, Philadelphia 42, Pa.

38. Materials handling equipment. A conveniently arranged 36-page catalog covering a wide variety of materials handling equipment and "C" clamps

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These are versatile, economical machines for handling an almost unlimited variety of secondary finishing work—deburring, filing, lapping, polishing, etc.—on metal and plastic parts.



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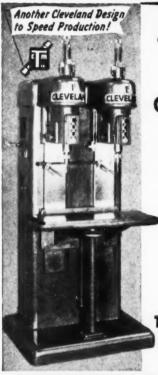
4502 Alpine Ave., Cincinnati 36, Ohio

has been released by Allied Mfg. & Sales Co., Dept. BB, 201 N. Wells St., Chicago 6, Ill. Included are 2-wheel hydraulic lift hand trucks, fork lift stacker hand trucks, hydraulic material elevators, barrel and tote pan dumpers, derricks and hoists.

39. Slitting saws and screw slotting cutters are listed and illustrated in a 40-page hard-backed catalog of Summit tools, offered by L. H. Chappel & Co., Dept. BB, 1137 Post Rd., Box 505, Fair-

field, Conn., exclusive U.S. distributors. Specification tables, applications and price lists are included, as well as table of cutting speeds for high speed steel saws.

40. New standards covering fraction taps for unified and American screw threads are given in a four-page leaflet of Sossner Tap and Tool Corp., Dent. BB, 27 Broadway, Lynbrook, L.I., N.Y Can be inserted into company's tap catalog.



SPEED UP

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The Cleveland Model E0 Duplex Lead Screw Tapping Machine does small hole tapping with a speed and precision equal to many larger machines! With separately operated spindles set up and change over time is eliminated on many jobs with a wider range of work made possible. Multiple heads for tapping groups of holes may also be used.

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THE CLEVELAND TAPPING MACHINE CO.

A Subsidiary of AUTOMATIC STEEL PRODUCTS, INC.

For Better Tapping -- Faster!

tapping machines

lead screw



41. Indicators. Models No. 222 and No. 333 (fixed position) indicators are pictured and detailed in brochures of the Gem Instrument Mfg. Co., Dept. BB, 6523 Euclid Ave., Cleveland 3, Ohio. Contact points and height gage attachment are also discussed.

42. Marblette manual distributed by The Marblette Corp., Dept. BB, 37-27 Thirtieth St., Long Island City, N.Y., profusely illustrated with many applications where these phenolic casting

resins can be used to advantage. Included are the several types of Marblette cold setting resin, heat resistant resins, transparent resin; types of molds and preparation; machining, finishing and fabricating; 78 pages.

43. Abrasive Grind-O-Flex wheel, of various grits, consisting of leaves of abrasive cloth made into a wheel for hard-to-get-at places, as well as conventional grinding and polishing, is fully explained in a folder from Merit Prod-

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Its Always 8 to 1 Or Better With the "FUTURMILL" the indexable solid carbide

blade milling cutters.

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ucts, Inc., Dept. BB, Culver City, Calif.

44. Thread comparator accessories for standard and special applications and ring snap thread gages, setting plugs, gage stands, etc., are shown and described in folders available from Johnson Gage Co., Dept. BB, Bloomfield. Conn.

45. Multiple spindle drill heads made by Durant Tool Supply Co., Dept. BB, 155 Orange St., Providence 3, R.I., including six different types of drill heads in 17 sizes, as well as special units, are shown in their latest folder.

46. Super-spacer and general facilities brochures issued by The Hartford Special Machinery Co., Dept. BB, 287 Homestead Ave., Hartford, Conn., explain the 8" and 12" models and give suggestions on a few of the many uses for this device. The general facilities brochure also provides a comprehensive picture of equipment and skills avail-

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- Oriented
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Syntron EB-0 Parts Feeder feeding roller bearings to a centerless grinder.

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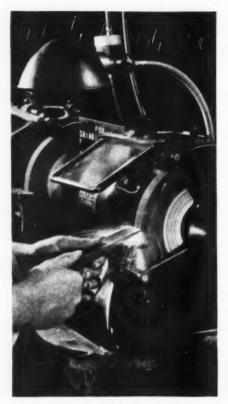
47. Hole punching units developed especially for punching holes in angles, extrusions, shapes and sheets are described in a 17-page booklet issued by Wales-Strippit Corp., Dept. BB, 345 Payne Ave., North Tonawanda, N.Y.

48. Sine angle plate distributed by American Standard Co., Dept. BB, 1 West St., Plantsville, Conn., is said, in their latest leaflet, to simplify accurate checking and grinding of angles from

 $0\,^{\circ}$ to $90\,^{\circ}$ within extremely close tolerances.

49. Gear shaping booklet for executives written in telegraphic style; non-technical; tells where, when and how shear-speed gear shaping process fits into today's plant—request Bulletin SP-53 from Michigian Tool Co., Dept. BB, 7171 E. McNichols Rd., Detroit 12, Mich.

50. Micrometers, magnetic floaters and milling machines, precision universal



Cut your TOOL GRINDING costs...with wheels engineered for the job!

Choose the right grinding wheel for every tool grinding job—from the complete line by CARBORUNDUM.® That's the first step toward longer cutting life for your tools...lower maintenance costs in the tool room.

Every tool room grinding wheel by CARBORUNDUM is engineered to do a specific job at the lowest possible cost. You may want faster production of cutting angles, rakes and clearances; or perhaps better finish is more important; or cooler cutting. Whatever features, or combination of features, you may require—there's a tool room grinding wheel by CARBORUNDUM that's right for you. Whether you're grinding high speed steel, alloy, or cemented carbide cutting tools, not only these wheels but coated abrasive belts by CARBORUNDUM can help you cut costs.

YOUR CARBORUNDUM DISTRIBUTOR or salesman is ready to help you make the right selection—why not call him today?

Two Heipful Booklets . . . "Maintenance of Alloy and High Speed Cutting Tools" and "Grinding Cemented Carbides"—tell you more ways to cut tool room maintenance costs. They're free—ask for either or both. The Carborundum Co., Dept. B B 81-316A, Niagara Falls, New York.



CARBORUNDUM

the ONLY source for EVERY abrasive product you need

81+3164

bench and pedestal types, are all fully explained and illustrated in brochures available from L. H. Chappel & Co., distributors, Dept. BB, 1137 Post Rd., Fairfield, Conn.

51. Shell manufacturers or fabricators of such items as cups by the drawing process will welcome a chart that is claimed to save long, tedious hours of computation in the tool, die and stamping industry; write R. J. Rizzo, Con-

sulting Engineer, Dept. BB, Engineering Bldg., 114 Liberty St., New York 6, N.Y., enclosing 25c.

52. Roller chain and sprocket purchasers will find all the data required in a new 24-page, 8½"x11" bulletin sent out by Dodge Mfg. Corp., Dept. BB, Mishawaka, Ind. Advantages of taper lock sprockets are covered by concise descriptions and cartoon illustrations.

A must in every tool room and inspection department . . .

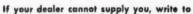
PRECISION SURFACE GAGE

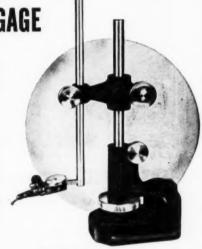
PAT. PENDING

Here at last is a surface gage, designed for efficiency and accuracy in checking measurements on the surface plate with the use of an indicator and size blocks.

Easily manipulated with one hand only the other hand is left free for the holding of rolls, etc. where it is inexpedient to use a clamp and assistance is not readily available.

The exceptionally smooth adjustment for height is in a vertical plane and all backlash is virtually eliminated. Working range is from ZERO to 18" in height. With the use of an extension rod any height within practicable working limits may be attained.





FINISHED IN BLACK & CHROME

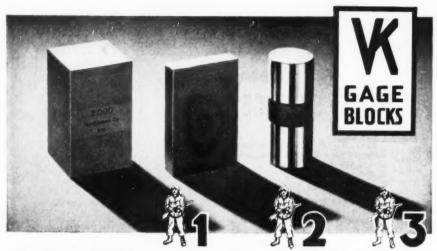
AMERICAN STANDARD COMPANY Dept. B. Plantsville, Connecticut

53. Portable electric power tools including industrial and automotive tools, drills, grinders, hammers, saws, screwdrivers, balancers, impact wrenches, valve refacers and seat grinders, air hammers, nut setters, sanders, polishers, tappers, nibblers, etc., are described and shown in a new catalog distributed by Thor Power Tool Co., Dept. BB, 175 N. State St., Aurora, Ill.

54. Cylindrical grinding machine, 418 plain, made by The Van Norman Co., Dept. BB, Springfield 7, Mass., said to provide economical, close tolerance short run or production grinding of small parts, is covered in their latest bulletin.

55. Unbrako socket screw products made by The Standard Pressed Steel Co., Box 606, Jenkintown, Pa., including socket head cap screws, self-locking socket set screws, shoulder screws, flat head socket cap and button head socket screws, are described in a bulletin just out.

56. A new thermo electronic potentiometer signaling type pyrometer controller manufactured by Thermo Electric Co., Inc., Dept. BB, Fair Lawn, N.J., is shown in a six-page catalog, Section 50. This features automatic temperature control with Null balance accuracy, high sensitivity, and continuous response.



SOLDIERS THREE . . . defending production accuracy

To meet the requirements of the current defense effort in meeting closest limits of accuracy and protecting production,

Yan Keuren is currently furnishing three types of gage blocks:

SOLID SQUARE MASTER BLOCKS

2-RECTANGULAR REFERENCE GAGES

-MICROGAGES

Shipment on complete sets of any of these three types can be made within 60 days from receipt of order.

VK Solid Square Master Blocks are accurate to .000004" per inch of length and are designed for laboratory use or to are designed for laboratory use of to standardize all shop dimensions. Large wearing surface; perfect parallelism. Available in 85- and 41-block sets and quaranteed unconditionally for 5 years not to exceed .0001" in wear.

VK Rectangular Reference guaranteed accurate to .000008" per inch of length and are designed for the inspection department or precision set up work. They are available in 81-block and

sets. Individual blocks from 33-block either of these sets can also be furnished. Certificate of size is also furnished with each set.

VK Microgages are accurate to plus .000012", minus .000008" per inch of length and are designed as working gages for shop use . to put accuracy at the machine. Wearing surface is 40% greater than that of rectangular gage blocks, hence their long-wearing quality. Available in several set combinations.

Van Keuren Gage Blocks are fully described in Catalog and Handbook No. 35, yours for the asking by writing: The Van Keuren Co., 177 Waltham St., Watertown, Mass.



77 WALTHAM STREET, WATERTOWN, MASS.
Light Wave Equipment - Light Wave Micrometers - Gage Blacks - Taper
Insert Plug Gages - Wire Type Plug Gages - Measuring Wires - Thread
Measuring Wires - Geer Measuring System - Shep Triangles - Carebolay
Cemented Carbide Plug Gages - Carbolay Cemented Carbide Measuring Wires





Dodge Manufacturing Celebrates Diamond Anniversary

A SERIES OF community and plant events commemorating the 75th anniversary of the Dodge Mfg. Corp., Mishawaka, Ind., launched the firm, recently, on its fourth quarter-century in the industrial field.

A plant Open House was attended by more than 3200 guests, who took guided tours of the plant while it was in full operation manufacturing its power transmission products. Small children were cared for in a nursery set up for the occasion, but the older ones shared their parents' interest in the proceedings. Each guest was served refreshments in a colorful courtyard setting and received souvenirs of the event.

The first product of the company to utilize a detachable bushing feature was the wood split pulley patented by Wallace Dodge, founder, in 1882. Then followed iron split pulleys, which later gave way to steel. Another stride forward in bushed products was the development of the Taper-Lock principle now being used in conveyor pulleys, shaft couplings and v-belt sheaves. Their most recent advancement is the Taper-Lock sprocket.

Throughout the three-quarters of a century of its history, Dodge has grown from one product to 6000, from a dozen workers to more than a thousand, and

from an original capitalization of \$50,-000 to a current net worth in excess of \$5,500,000.

Thor plans Atlanta branch office

A new Thor sales and service factory branch office will be opened in Atlanta, Ga., Oct. 1, it has been announced by J. A. Hill, vice-president and sales manager of Thor Power Tool Co., Aurora, Ill.

The Atlanta office will serve distributors and tool users in Georgia, South Carolina and Florida. Thor's new sales office in Newark, N.J., was opened in July, and the removal of its Buffalo, N.Y., branch into a new building was completed on May 8.

Appointments & Promotions

E. H. Schoonmaker has been appointed district manager of the St. Louis, Mo., district sales office for the Eddystone div. of Baldwin-Lima-Hamilton Corp., Philadelphia, Pa., according to an announcement by L. A. Hester, manager of sales. Previous to the recent appointment, Schoonmaker was acting manager of the district.





ous type reflectors, arms and bases for every industrial use.

THE FOSTORIA PRESSED STEEL CORPORATION FOSTORIA, OHIO

Localites are available through wholesalers everywhere

Pangborn Corp., Hagerstown, Md., has announced the 1953-1954 appointments to the advisory council, founded in 1948 to give Pangborn employees an insight into the problems and accomplishments of management and promote better understanding between management and labor.

New members include: C. R. Berry, foreman, sheet metal dept.; W. A. Byers, supply div.; Louis Cline, sales dept.; R. M. Morganthall, order division; G. W. Powell, chief design engineer; Milo E.

Thomas, foreman, screen and rubber dept.; John H. Wiles, research engineer; and Robert J. Zoller, assistant advertising manager. Continuing members of the council are: E. H. Cline, order division; Adnah Gruber, engineer, esti-mating and proposals; G. L. Piper, foreman, inspection dept.; and Harold Trovinger, shop personnel manager.

Appointment of Carl W. Larson to the Products Eng. Dept. has been announced by the Trane Co., LaCrosse, Wis.

Drill Hardened Steelswithout Annealing –



With the new, improved "HARDSTEEL" Drill, you can do accurate, smooth drilling, countersinking, counterboring and reaming in steels hardened by any process without first annealing the work. And they work with equal ease on work-hardening steels and high carbon—high chrome steels of any degree of hardness.

"HARDSTEEL" Drills fit standard drill presses. They save time and reduce rejects. They permit engineering changes requiring additional drilling after hardening. And parts drilled after hardening always match at assembly.

Write for a copy of the "HARDSTEEL" Operators Manual showing how "HARDSTEEL" drills are cutting costs in thousands of plants.

You Harden It—We'll Drill It— With "HARDSTEEL"

BLACK DRILL COMPANY, INC.

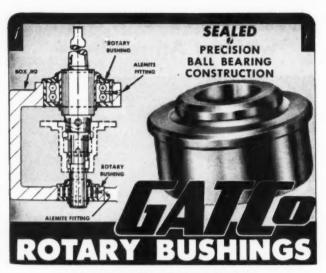
Also makers of — BLACK DRILLING UNITS — AUTOMATIC, SELF-CONTAINED — FOR COST-CUTTING PRODUCTION ON ALL MATERIALS

Write for information

Sterling Eng. Co., Laconia, N.H., a subsidiary of American Machine & Foundry Co., has appointed two manufacturer's representatives as agents for the company's line of electrical relays. Sam S. Dewson, with headquarters at 520 North Dearborn St., Chicago, will serve the Chicago area and parts of Illinois, Indiana, Michigan, and Wisconsin. J. O. Schmitz, whose offices are at 34th St. and Broadway, Kansas City, will serve Missouri, Kansas and Nebraska.

Richard J. Benefield has been appointed as salesman and assigned to the Pacific district office of the Carboloy department of General Electric Company in Huntington Park, Calif. He will cover the San Francisco and northern California, Oregon and Washington areas. Grant A. Morrison is representing Carboloy in the Midwest.

Adamas Carbide Corp., Harrison, N.J., has announced the appointment of Raymond J. Nagy, Simsbury, Conn., as its sales representative for Connecticut.



FOR DRILLING, CORE DRILLING, ROUGH AND FINISHED BORING

The inner race of the GATCO bushing rotates with the tool, piloting the tool accurately below or above the work—or both.

Eliminates expensive tool construction—Reduces tool wear—Prevents seizure and pilot breakage—Especially adapted where precision is required.

Write for full information and prices

GATCO ROTARY BUSHING CO.

42330 ANN ARBOR ROAD, U.S. 12, PLYMOUTH, MICH.
Telephone PLYMOUTH 1472



Arthur V. Peterson



Rudolph Winters

Arthur V. Peterson, formerly with the Atomic Energy Commission, has joined the staff of the vice-president in charge of engineering of American Machine & Foundry Co., New York, N.Y., it has been announced by Morehead Patterson, AMF board chairman and president.

Clearing Machine Corp. recently announced the appointment of **Rudolph Winters** as superintendent of their Hamilton, Ohio, plant.



Here's what the plant manager at Avey Drilling Machine Co., Cincinnati, has to say about Standard's Twin Wheel Tool Grinder:

"Any grinder that stands the punishment that we give it here at Avey must be a good grinder. All day long, day after day, we grind Carbide tipped lathe tools including boring, cut-off forming, and other high-speed steel tools. Maintenance bas been only routine. Down time . . . none. Its economy is amazing."

Why not install a Standard Twin Wheel grinder in your plant? Available in 10" and 14" wheel sizes, wet or dry. No spray or splash when wet grinding. Two operators can grind at once. Conserves floor space. Write for Bulletin TW.

See this machine in operation: National Metal Exposition, Cleveland: Oct. 19-23. Booth 840.

standardize with . . .

the STANDARD electrical too

2486 RIVER RD. . CINCINNATI 4 . OHIO

increased production
30% decreased grinding time
grinding costs way down
less operator fatigue
much longer wheel life

one step
from rough to
finish grind





UFKIN

UNIVERSAL DIAL TEST INDICATOR Shortens Working Time

Modern simplified design gives faster readings, guarantees long accurate service. Extra long hole attachment screws directly into base requires no supporting arms. One piece base and shank, jewelled thrust bearing, smooth, sensitive mechanism that requires no ciling, adjustable bezel and the easy-to-read dial make the Lufkin Universal Dial Test Indicator lighter, more accurate, more durable. Packed in fifted wood cases complete with all attachments.

Many New UFKIN Precision Tools
make your work easier and better
SEND FOR Free ILLUSTRATED New Tools Booklet

BUY UFKIN TAPES · RULES · PRECISION TOOLS
From Your Distributor

THE LUFKIN RULE CO., Saginaw, Michigan, Dept. MTB 132-138 Lafayette, New York City — Barrie, Ontario



Julius Saloway, for the past number of years manager of the Liquidation Div. of Morey Mach. Co., Inc., New York, N.Y., has been elected to the directorate of the company.

Einar A. Hanson, vice-president of Hanson-Whitney Co., Hartford, Conn., has announced the appointment of Ralph Edwards as general sales manager, machine tools; and Edward P. Cody as general sales manager, small tools and gages.



Julius Saloway



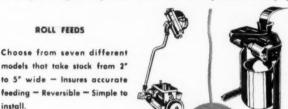
Ralph Edwards

DIRANT LINE OF PRESS ROOM EQUIPMENT

THE SELECT-O-MATIC ROLL FEED INDEXER

Replace your present roll feed clutch with this DURANT SELECT-O-MATIC multi pawl indexer that accurately controls close feeding due to its 6720 possible stations.

Write for complete information on our line of economically priced press room equipment



SCRAP CHOPPERS

Fits all power presses and has simple electrical plug in installation. Low first cost pays for itself - Pennies per day to operate.

STOCK OILERS

install

ROLL FEEDS

Prolong die life as they clean and lubricate stock in one operation. Variety of models are available. Eliminates hand oiling yet inexpensive.



STOCK STRAIGHTENERS

Motor driven equipment (shown) is perfect for thin materials. Top rolls are adjustable for thickness. Standard straighteners also available.

Inquire about our STOCK REELS, FOOT PRESSES, COIL CRADLES, WIRE STRAIGHTENERS, and PRESS FEEDS. Complete free catalog ready now. Write today.

TOOL SUPPLY (1550 RANGE STREET, PROVIDENCE 3, R. I.

The promotion of E. G. "Bud" Brown, Jr., to factory sales representative has been announced by J. H. Williams & Co., Buffalo, N.Y. Brown will cover eastern and southeastern Pennsylvania and Maryland with the exception of Baltimore. He formerly assisted J. J. McCann, Philadelphia district manager.

The appointments of two advertising men at Norton Co., Worcester, Mass., have been announced by C. Leonard Shaw, publicity manager.

David B. Tyler has been named to handle advertising of Norton's precision grinding and lapping machines, refractory and boron carbide products. Clifford S. Duxbury, Jr., will direct Norton's export advertising.

Robert L. Schwaegerle, abrasive engineer in the eastern Iowa territory will retire July 1. He will be succeeded by Robert H. Johnson.

S. R. Zimmerman, Jr., has been elected a director of Raybestos-Manhattan, Inc.



SIMPLIFIED OPERATION of "Bear" Dy-Namic Balancing Machines is so fast, so economical, so easy to learn that manufacturers, maintenance shops and others are employing this revolutionary method with top-production results. No complicated manipulations to learn! Average shop man can

learn to balance in a few hours! Get full details by sending for FREE DY-NAMIC BALANCING MANUAL

eliminate noise and vibration, reduce wear and improve performance of rotating parts, quickly, accurately, and economically. Write: Bear Mfg. Co., Dept. M20 Rock Island, Ill.



E. W. Vickery, general manager of the Syracuse, N.Y., plants of the U.S. Hoffman Machinery Corp., has appointed John C. Walsh to the post of superintendent of both the Lamson St. and Greenway Ave. plants in Syracuse.

Dean Weikart, former tool and product engineer with Rockwell Manufacturing Company's Crescent Machine Div., Leetonia, Ohio, has been promoted to chief engineer of the firm's Tupelo, Miss., plant.

James L. MacDowell, a veteran at 37



John C. Walsh



Dean Weikart



WHY WAIT FOR SPECIAL TAPS?

. Has them IN STOCK for IMMEDIATE DELIVERY!

HIGH SPEED

SPECIAL RIGHT HAND TAPS

SIZE	THREAD	SIZE	THREAD	SIZE	THREAD
4	82-48-88-84	3/8	12-16-18-20-27-28-32-36-40-48	1-3/4	8-10-12-14-
8	30-32-38-48-	7/16	12-16-18-22-24-27-28-30-32-36-		16-18-20-24
-	80	.,	40	1-13/16	8-10-12-14-
6	38-40-48-88-89	1/2	12-14-18-18-22-24-28-27-28-30-		16-18-20
7	32-40		32-40	1-7/8	8-10-12-14-
8	24-30-36-38-	9/18	16-20-24-27-28-30-32-40-48		16-18-20-24
	40-44-48	5/8	12-14-16-20-24-27-28-32-38-40	1-15/16	8-10-12-14-
	24-28-32-48	11/18	11-16-18-20-24-27-28-30-32	-	16-18-20-24-28
10	28-30-36-40-	3/4	9-11-12-14-18-20-24-26-27-28-32	2	4-1/2-8-10-
12	48-64	13/16	10-14-18-20-32		12-16-18-20
14	20-28-32-38	7/8	10-12-16-18-20-24-27-28-32	2-1/16	12-14
1/10	80-84	15/16	8-9-10-12-14-16-18-20-24-32	2-1/8	12-16-20
5/84	72	1	10-12-16-18-20-24-27-32-40	2-1/4	4-1/2-8-12-
3/32	48	1-1/16	12-14-16-18-20-24	/4	14-16-18
7/64	48-56	1-1/8		2-5/16	12-18
1/8	32-40		8-10-14-16-18-20-24-32	2-3/8	12-16-18
5/32	32-36-48	1-3/16	8-10-12-14-16-18-20-24	2-1/2	8-10-12
9/64	36-40	1-1/4	8-10-14-16-18-20-24-32	2-9/16	18
11/64	36	1-5/16	12-14-16-18-20-24-32	2-5/8	12-16-20
3/16	20-24-32	1-3/8	8-10-14-16-18-20-24	2-3/4	16
13/64	32	1-7/16	8-10-12-16-18-20-24	2-7/8	8-12-16
7/32	24-28-32	1-1/2	8-10-14-16-18-20-24-28	3	8-16
1/4	18-24-26-27-	1-9/16	18-20-24	3-1/4	8-12-16
	30-32-36-40			3-1/2	8-16 8-12-16 8-12-16
5/16	16-20-22-27- 28-32-40	1-5/8	51/2-8-10-12-13-16-18-20-24	3-7/8	
	20-32-40	1-11/18	10-12-14-16-18-20-24	4	8-12

HIGH SPEED LEFT HAND TAPS

SIZE	THREAD	SIZE	THREAD	SIZE	THREAD
0	80	3/8	16-24-32	1-3/8	6-8-10-12-16-18-20-24
!	56-64-72	7/16	14-20-28	1-7/16	8-10-12-14-16-18-20
2	56-64	1/2	12-13-20-28	1-1/2	6-8-10-12-16-18-20
3	56	9/16	12-18-20-24	1-9/16	8-10-12-16-18-20
:	32-36-40-48	5/8	11-12-18-20-24	1-5/8	8-10-12-14-16-18-20
3	40-44 32-36-40	11/16	11-16-24	1-11/16	8-10-12-14-18-18-20
	32-36-48	3/4 13/18	16-16-18-20	1-3/4	8-10-12-14-16-18-20
10	24-30-32-40	7/8	9-12-14-18-26		
12	24-28-32	1/8	8-12-14-18-18-20	1-13/16	8-10-12-14-16-18-20
1/4	20-28-32	1-1/8	7-12	1-7/8	8-10-12-14-16-18-20
5/16	18-20-24-28-32	1-1/4	7-12-18-18	1-15/16	8-10-12-14-16-18-20 41/2-10-12

 SPECIAL AND LEFT HAND DIES IN STOCK Prices on Application We are always adding new sizes

NOTE: Oversize — Undersize — Metric — 64th and 32nd
Size Taps Available for Quick Delivery.

DEALER INQUIRIES INVITED

TOOL COMPANY, INC. CUTTING TOOL SPECIALISTS LAFAYETTE STREET . NEW YORK 13, N. Y.



Machine de-burring with NOBUR pays 816 production dividends:

NOBUR Tools turn a slow bench operation into fast and efficient machine work! Remove burrs on multi-walled parts with a smooth, clean cutting action that won't mar highly finished surfaces. Eliminate rejects from slow, costly hand work with files, scrapers and abrasives.

Nobur Tools are used on any lathe, drill press, portable drill or flexible shaft. Operation of the double-edge cutting blade is easy and safe... no skilled help is required, and the spindle never needs to be stopped for either de-burring or chamfering.

Nobur Tools cut freely on either hard or soft metals, are simple in construction and are made in sizes to cover a full range of hole diameters. *NEW "DS" SERIES extends range of NOBUR applications to holes as small as 1/8" diameter. WRITE FOR FULL DETAILS TODAY!





James L. MacDowell



Herbert R. Fesmire

of 20 years with the Standard Pressed Steel Co., Jenkintown, Pa., has been made manager of tooling and quality at the firm. MacDowell succeeds Albert A. Leedom, who has been assigned to the staff of Cooper Precision Products, an SPS subsidiary in Los Angeles. Herbert R. Fesmire succeeds MacDowell as head of the automatics department, and Mark A. Hawkins replaces Fesmire as general foreman in the department. James B. Snyder, cost accountant, moves up to chief accountant in place of Charles F. Roberts, who also has been



PRODUCTS LAPEER MFG. CO. 3052 DAVISON ROAD . LAPEER, MICHIGAN

WESTERN DIVISION—422 MAGNOLIA • GLENDALE, CALIF.
CANADIAN DIVISION—HIGGINSON ENGR. • HAMILTON, ONT.

transferred to Cooper Precision Products on the West Coast. Part of Roberts' duties—direction of the credit dept. at SPS—will be taken over by William L. Slotter, financial analyst.

The appointments of R. L. Schutte to sales manager, P. H. Staerk to advertising manager, and J. E. Davis to assistant treasurer have been announced by F. O. Burkholder, president of Ahlberg Bearing Co., Chicago.

The appointment of Nicholas D. Vuyosevich as manager of their newly acquired Hi-Pac division was announced by Carter C. Higgins, president of the Worcester Pressed Steel Co., Worcester, Mass. Vuyosevich was formerly executive vice-president of Hi-Pac Corp., and has been associated with the firm since its founding in 1947. The chief engineer of Hi-Pac, Albert Manhartsberger, will also become associated with the new division.

READ THIS AND REAP

Dollars Worth of Savings Every Time You Cut A Keyway

du Mont

Keyway Broach
Kits you can cut
any standard size
keyway from
1/16" to 1", in any
bore from ¼" to
3", in any gear,
milling cutter,
pulley hub, collar
or coupling

in one minute for one cent each

SAVE TIME SAVE MONEY CLIP THE COUPON



The du MONT CORPORATION, Greenfield, Mass.

Mail me free Catalog and Price List T on Minute Man Keyway Broaches and Kits.

Name

Company

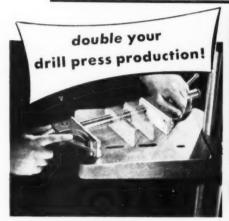
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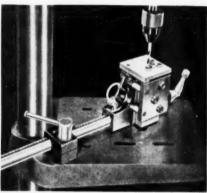
The opening of Indianapolis Machinery & Supply Company's New York showroom has been announced by E. Letzter, president. Edward Curvelo has been appointed manager of the New York branch, which also includes export activity conducted here for the past fifteen years.

Henry A. Roemer, Jr., president of Sharon Steel Corp., Sharon, Pa., has announced the appointment of Wilbur T. Blair as vice-president and treasurer of the company. A. P. Emmert, former president of the Warner Gear Div. of Borg-Warner Corp., Chicago, has accepted the general managership of the company's Detroit gear div. Announcement of his appointment was made recently by Roy C. Ingersoll, president.

Ed Kelly, for 23 years associated with Greenlee Bros. & Co., Rockford, Ill., and sales manager of the Screw Machine dept. since 1943, has retired. He is succeeded by Harold V. Bailey, as-

NEW AMF Float-Lock Instant-Change Safety Vise





IDEAL BASE FOR DRILL JIGS

Retaining its full-floating and locking features, but otherwise completely redesigned, the new AMF Float-Lock *Instant-Change* Safety Vise is faster, huskier, greater in capacity (9" and 12" jaw openings)...the most versatile, most economical work holder yet devised for drill presses!

New ratchet-locking jaw slides *instantly* to desired opening. The other, screw-operated jaw positively locks—or completely releases—work with a mere flick (about ½-turn) of the handle.

Vise turns over readily on three sides, permits extensive drilling without removing work. Horizontal and vertical "V" grooves align and grip rounds for end drilling, centering...ideal for angle drilling. Vise serves as low-cost drill jig when locked anywhere on the table...swings out of the way when not needed. Saves so much set-up time, compared with usual work-holding devices, that good operators should easily be able to double their production!



Contact your local AMF Float-Lock distributor for a demonstration.

Or write for his name and address and a copy of new, descriptive Folder WF 53-1(a). Wahlstrom Float-Lock Sales Dept., American Machine & Foundry Company, 511 Fifth Ave., New York 17, N. Y.



MODELS ALSO AVAILABLE FOR BAND SAWS



sistant sales manager of the screw machine department, who has been with Greenlee for 20 years.

Announcement is currently made by Charles F. Meyers, vice-president and director of sales of Morse Twist Drill and Machine Co., New Bedford, Mass., of the appointment of Fred Duff to the district managership of Morse operations in Chicago and surrounding areas. Duff was formerly district manager in Cleveland and in metropolitan New York City. Rex Bennett has been ap-

pointed district manager to succeed Duff in metropolitan New York.

The appointment of Thomas W. Gabriel as assistant vice-president in charge of sales of Jessop Steel Co., Washington, Pa., has been announced by Charles E. Rice, sales vice-president.

The Columbia Tool Steel Co., Chicago Heights, Ill., announces the appointment of H. Wilson Ryno as their sales representative in the New Jersey and New York districts. Mr. Ryno has his office at 1060 Broad St., Newark, N.J.

CERVINIA 4

Universal Milling Machine

DELIVERIES

COST very low



SPARE PARTS

SERVICE nationwide

SPECIFICATIONS: MORSE TAPER NST No. 50

■ WORKING SURFACE POWER FEED RANGES: Longitudinal 471¼", Cross 13¾", Vertical 19"

■ 24 FEEDS: Range 3/64" to 18" per minute

RAPID TRAVERSE: 60" per minute

12 SPINDLE SPEEDS: Range 16 to 1000 rpm MOTOR 8 HP

For further information, write or call: MISAL MACHINERY, INC.















1 EAST 53RD STREET, NEW YORK 22 . ELDORADO 5-7278

industrial products div.

Progressive Welder Sales Co., Detroit, Mich., announces the appointment of William F. Tingler as director of advertising and sales promotion.

Niagara Machine and Tool Works of Buffalo, N.Y., announces that J. H. Horton has rejoined its sales staff after serving in the armed forces. He will work out of the Philadelphia district office located in Wynnewood, Pa. Appointment of William S. Hough as Chicago district manager of the Johns-Manville industrial products div., New York, has been announced by C. G. Dandrow, vice-president and general sales manager of the division. Hough succeeds George R. Frankland, who has retired after forty years with the company. Milton B. Roth, formerly a sales engineer for the division at Chicago, will assume Hough's former duties in Chicago as assistant district manager,

New Superior Magnetic Base Holder

FOR MOUNTING TEST INDICATORS INSTANTLY TO FLAT OR DOWN TO 3/4" ROUND WITH PULL OF 65 LBS.



Model 100 being used to align fixture in production mill.

PRICE \$8.00 COMPLETE. Attractively boxed. · Every indicating problem now equily solved.

. No more indiscriminate clamping.

All materials and workmanship unconditionally gear-

> NEW! Feel preof adap-tor allowing 360* adjustment in all directions.

NEWI

3-step universal rod for all indicators. Sizes

Magnetic pull

NEW!

Ball swivel and stem of non-magnetic material.

NEW!

Sure-grip non-breakable tenite plastic case 1% wide, 1% "long and 1 1/2" high.

SEND NOW FOR BULLETIN NO. 605 COVERING OTHER TINY-TITAN TOOLS

NO. 120	Combination magnetic base indicator holder and magnifier	\$12.50
NO. 130	Precision adjustment magnetic base holder, pull 65 lbs.	\$ 9.50
NO. 150	Heavy duty duplex magnetic base holder, pull 125 lbs.	\$15.50
NO. 160	Precision adjustment heavy duty duplex magnetic base holder	\$17.75
NO. 200	Magnetic base "HANDI-LITE" pull. 65 lbs.	\$ 8.50
NO 250	Heavy duty mannetic base lighting unit-holds 100 watt hulb	\$18.50

ENCO MANUFACTURING COMPANY, Dept. 293 4520-26 W. Fullerton Ave., CHICAGO 39, ILL.

Order from your mill supply dealer or send order with name of your mill supply dealer

E. W. Ristau, vice-president in charge of power tool sales, Delta Power Tool Div., Rockwell Mfg. Co., Pittsburgh, Pa., announces the establishment of a new regional distribution setup involving appointment of four regional managers. They are Byron Coon, Oakland, Calif., Western division; George H. Madeska, Chicago, Central division; Walter H. Redpath, Toronto, Ontario, Canadian division; and George E. Rockwell, New York City, Eastern division.



Byron Coon



Gearge H. Madeska



George E. Rockwell



Walter L. Redpath



Hubert D. Tanner



Charles M. Pond

Top management changes at Pratt & Whitney, Div. Niles-Bement-Pond Co.. West Hartford, Conn., were announced by Frederick U. Conard, president. Charles M. Pond and Hubert D. Tanner, each of whom has served the company as vice-president and director, have retired. Vice-president Richard W. Banfield succeeds Pond as manager of the small tool and gage division.

The Viking division of Progressive Welder Sales Co., Detroit, Mich., announces the appointments of Lester J. Blackford as sales manager, and Earl A. Goyeau as assistant sales manager.



Earl A. Goyeau



L. J. Blackford

Victor W. Peterson Dies

Victor W. Peterson, 61, chairman of the board of the Hannifin Corp., Chicago, died suddenly July 1 at his Indiana farm.



BLUE M AUTOMATIC Recirculating Air Draw ELECTRIC FURNACE

check these extra value features

Wide range...300° to 1350° F...covers work usually needing several units. New electronic automatic controls, plus wattage selector switch and alloy interior combine to give you maximum efficiency.

Safer...opening the door automatically shuts off air flow and door locks itself wherever stopped. Blue M's stepped-up air flow rate stops air anemia at high temperatures.

Working Chamber 12" W x 14" D x 12" H . . \$924.00 Working Chamber 15" W x 24" D x 18" H . . 1395.00

Profe, W. FINE

Blue M Electric Co., 306 W. 69th Street, Chicago, Illinois



TOGGLE CLAMPS

De-Sta-Co Toggle Clamps are extremely flexible in their application and are economically and easily adapted to work-holding fixtures for assembly, welding, bonding, machining or other production processes. Smooth, fast, powerful clamping action clamps parts quickly . . . holds them firmly in perfect alignment . . . releases instantly for easy removal and insertion of new workpiece.

De-Sta-Co clamps are engineered for rugged use in production; reamed bearing holes insure precision fit, long life and sensitive operation . . . offsets in handles and links relieve friction . . . made with cold drawn bars, and forged portable clamp parts. Accessories for adapting clamps to specific applications are available.

> Write today for name of nearest distributor and your copy of the De-Sta-Co catalog which describes over 40 fixture and portable models with positive holding pressures up to 4000 pounds.



DETROIT STAMPING COM

347 MIDLAND AVE. . DETROIT 3, MICH.

Universal American buys Norma-Hoffman

Controlling interest in the Norma-Hoffman Bearings Corp., Stamford, Conn., has been purchased by the Universal American Corp., New York, from the Hoffman Mfg. Co., Ltd., of Chelmsford, England. The transfer ended the British control which has been in effect for nearly 30 years.

Norma-Hoffman will continue to operate as a separate company, with no change of officer personnel, except that

Herbert M. Singer of the firm of Levian & Singer, attorneys, has been elected chairman of the board. Officers of the Norma-Hoffman Bearings Corp. who were re-elected are William L. Hubbard, president; Robert L. Miller, vicepresident in charge of sales; Dwight Batesole, vice-president in charge of engineering; A. J. Schmiel, secretary and treasurer; and F. Milton Evory, assistant treasurer. Leonard Morey, president and board member of Morey Machinery Co., Inc., New York, has been elected to the board of directors.



- 2 SAVE ON MAN HOURS with a Lucifer Electric Furnace. Less operator attention needed Lucifer controls are EXACT. They reach SPECIFIED heat rapidly and retain SPECIFIED temperature without variation. Ne special experience required when you use a Lucifer Furnace.
- 3 SAVE on maintenance expense with a Lucifer Electric Furnace. Finest refractory materials are built into Lucifer Furnaces for better, more officient heat retention. Elements are guaranteed, long lived, trouble free. More than two thousand satisfied users.

CHECK THESE PRICES

Furnace Size	2000'	2300'
6x 6x12"	\$ 467.00	\$ 548.00
9x 9x18"	647.50	764.00
12x12x24"	912.00	1068.90
10-10-205	1410 75	1600 80

Complete with 100% automatie electronic controls.

WRITE FOR FREE literature, specifications and price list of Lucifer Furnaces in wide range of sizes—top loading and side loading types. Engineering advice without obligation. Write, wire or phone today,

LUCIFER FURNACES, INC.

Neshaminy I, Pa.

Phone Hatbero 0411

Successors to Gilbert S. Simonski Company

A.A.M.I. meets in New York

A meeting of the American Association of Machinery Importers, Inc. in New York City on June 15, 1953, was attended by more than 100 importers and their European suppliers, representatives of foreign Consulates, and others. Harry S. Radcliffe, executive vice-president of the National Council of American Importers, was the keynote speaker. The theme of his talk was the creation of a liberal trade and tariff policy by the Eisenhower Ad-

ministration.

Others who spoke were: George R. Vonderahe, Kurt Orban Co., Inc., New York; Irwin Lubalin, of the International Mach. Div. of British Industries Corp., New York; Fred Weil, of Perrish Steel Products, Inc., New York; Eric R. Bachmann, Eric R. Bachmann Co., New York; H. E. Sobel, Sobel Shipping Co., New York; Jack Townsend, A. A. Jones & Shipman Ltd. of England; and Hyman Golub, U.S. customs examiner.



Gages available for checking "O" Ring, Truarc and other retaining ring grooves,

Fiftieth anniversay for Challenge Machinery

The Challenge Machinery Co. recently marked its 50th anniversary of manufacturing in Grand Haven, Mich.

The company first started in Chicago in 1870 as an electrotype foundry under the name of Shniedewend & Lee. In 1893 the firm was reorganized as The Challenge Machinery Co.; it moved to Grand Haven in 1903. Challenge now has three plants, with a combined

floor space of 240,000 sq. ft. on 10 acres of land.

Current company officers are J. Edgar Lee, president; J. Wesley Lee, executive vice-president; Ralph G. Wilson, treasurer; and E. Paul Babcock, secretary.

19372 James Couzens Highway, Detroit 35, Mich., is the new address of the Detroit office of Scully-Jones and Co.



WHITNEY METAL

WHITNEY-JENSEN No. 230 — No. 231 DEEP THROAT POWER PUNCH PRESSES

These sturdy, deep-throated presses are widely acclaimed for their high speed and accurate production. Frames are welded steel; auxiliary attachments available; various punches and dies in stock for these two outstanding models.

Capacity: 20 tons Throat Depths: 18" and 24"

WHITNEY METAL TOOL COMPANY
115 FORBES STREET, ROCKFORD, ILL.

Willard F. Rockwell, Jr., 39-yearold president of Rockwell Mfg. Co., was selected as one of Pittsburgh's "100 outstanding young men" by a committee of civic leaders.

The 100 were chosen on the basis

of accomplishments to date in their respective fields as well as their civic contributions and future promise. To be eligible for selection, a candidate had to be under 40 years of age and a resident of Allegheny County.



Carboloy Department of Gen. Electric Co., Detroit, Mich., has announced 15 percent price reduction on its general purpose, single-point cemented carbide tools. According to the Department, greater volume production resulting



W. F. Rockwell, Jr.

from increased demand, plus improved manufacturing procedures, placed it in a position to pass on savings to tool users.

Price reductions of from 15 to 20 percent on many types of metal-cutting tools and tool blanks were announced recently by Kennametal Inc., Latrobe,

The Landis Machine Co., Waynesboro, Pa., announces the relocation of its Chicago and Cleveland offices. The Chicago office, under the supervision of Paul A. Reynolds, district manager, is now located at 6920 W. North Ave. The Cleveland office, under the supervision of E. O. Peiffer, is now located at 13967 Cedar Road.

The Pearce Tool and Gauge Co., Chicago, has been appointed representatives for Schauer Speed Lathes, it was announced recently by Stewart E. Wright, vice-president in charge of sales. Pearce will represent Schauer in northern Illinois, Wisconsin, eastern Iowa and northern Indiana.



The Ready Tool Co., Bridgeport, Conn., announces the appointment of the Di Eugenio Tool Center, Phoenix, Ariz., as exclusive distributor for the states of Arizona, New Mexico and Colorado.

The Cleco Div. of Reed Roller Bit Co., Houston, Tex., has announced the appointment of J. Pegely and Son Hardware Co., Pottstown, Pa., as distributor for Cleco products in that area.

Six new stocking distributors have recently been appointed by Scully-Jones and Co., Chicago, Ill. The firms are: Walter R. Hammond Co., Minneapolis, Minn.; Precision Tool Sales, Tulsa, Oklahoma; and Eichman Machinery Co., Inc., Kansas City, Mo.; the E. A. Kinsey Co., Inc., Indianapolis, Ind.; J. M. Tull Metal and Supply Co., Inc., Atlanta, Ga.; and the E. A. Kinsey Co., Inc., Columbus, Ohio.



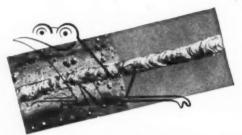


AIR HOIST

Also . . . Air Toels . . . Lubricating Equipment . . . Aircraft Products . . . Grease Fittings

Barwood & Co., Philadelphia, Pa., are now exclusive representatives in Baltimore, Philadelphia, Trenton, N.J., and adjacent territory for B. C. Ames Co., Waltham, Mass.

A. J. Rod Co., Houston, Texas, is now the Houston and southern Texas distributor for Kurt Orban Co., Inc., New York. Announcement is made by the Fulflo Specialties Co., Blanchester, Ohio, manufacturers of coolant pumps and valves, of the appointment of the following representatives: Lewis Pump Co., Philadelphia, Pa: Truman E. Longley Co., Cleveland, Ohio; Pump Engineering Co., Los Angeles, Calif.; Wooden and Little, San Francisco, Calif.; Robert Taylor and Sons, Salt Lake City, Utah; Rogers and Baxter, St. Louis, Mo.; R. MacLeay and Co., Ltd., Montreal, Canada.



WARTS ARE FOR TOADS, NOT WELDS

Spatter is usually a problem in arc welding . . . but these unsightly metal warts get the quick "brush off" with Protect-O-Metal No. 2. Simply brush or spray P.O.M. on weld area and adjacent surfaces. After welding, the troublesome weld spatter wipes off with a cloth or brush.

P.O.M. No. 2 causes no smoke, fumes or odors, is non-flammable and non-toxic. One coat serves for single or multi-pass welds, costs about 1/10¢ per foot, saves up to 85% of weld cleaning cost and labor. Order a trial gallon today. Satisfaction guaranteed.



G. W. SMITH & SONS, INC., 5410 Kemp Road, Dayton, O.

Yale & Towne expands to Midwest

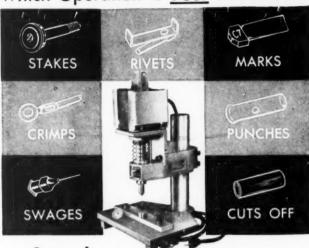
The Yale & Towne Mfg. Co., New York, N.Y., has purchased the Powdered Metal Products Corp. of America, Franklin Park, Ill., it was announced by Gilbert W. Chapman, Yale & Towne president.

Bryant Machinery & Engineering Co. announces the removal of its general office to 640 W. Washington Blvd., Chicago 6, Ill.

New Stadoil plant in operation

Stadoil Mfg. Co., El Monte, Calif., has announced that their new plant is in full operation. This is the 3rd move, each time to larger quarters, that the company has made since its founding in 1935. The new factory will more than double previous manufacturing facilities. Additional ground, adjoining the new plant, has been purchased to allow for planned future expansion.

Which Operation is Your Bottleneck?



Speed
Output with
LIGHTNING-FAST
ELECTROPUNCH

1100

- All-electric solenoid operated impact hammer with controllable blow
- Compact/economical/ versatile/ Plugs into 110
 A.C. outlets
- Lightest model only \$98.75

PRODUCES UP TO 5,000 hand positioned pieces per hr./ faster with automatic switching!

Write for all the details!

BLACK & WEBSTER, INC.

Dept. 5. 445 Watertown St., Newton 58, Mass. Blgelow 4-6370

Feedall Machine and Eng. Co. has recently moved to its new plant at 38399 Pelton Rd., Willoughby, Ohio. The steel and aluminum building has better shipping facilities and more than double the capacity of former quarters. Recent appointments under the expansion program were Richard H. Crotty, chief engineer; Claude C. Sowers, production manager. Lewis R. Winslow remains as president and sales manager.

Norton Behr-Manning Overseas Inc. announces a new plant, Behr-Manning Limited, located at Belfast, N. Ireland.

Providing 70,000 square feet of floor space, including office and factory areas, it is situated on about six acres just outside the city limits of Belfast. The land is leased from the Ministry of Commerce. The plant was built during World War II for a defense industry.

Norton Company's Grinding Machine Division at Worcester, Mass., announces the establishment of a new department





DIAMETERS .025 to .760 CLASSES XX, X, Y & Z

LONG LIFE: users report up to 50 times greater life than similar gages made of steel.

CUT CHECKING COSTS: Carbide gages eliminate frequent checking and provide material savings in checking costs.

LESS SCRAP: It is not necessary to add the usual wear allowance built into steel gages. This means fewer rejected parts due to "oversize" GO members.

LOWER GAGE INVENTORY: No need to buy "spares" to fill in while steel gages are out of the plant to be reworked to size.

(Ask for free bulletin No. 105)

S & E are regularly fabricating from Tungsten Carbide: Drill Bushings, Rotary Files, Reamers, End Mills, Wear Parts, Carbide inserted Screw machine collets and feed fingers, Plug Gages and Special Tools to blueprints.



called the Norton Job Lapping department, the company has now broadened its lapping capacity to handle many job lapping projects.

The Torrington Mfg. Co., Torrington, Conn., has announced the start of construction of a half-million-dollar plant addition. S. W. Farnsworth, chairman of the board, said that 46,125 square feet of additional floor space will be provided.

Recondition arc welders

Straight line mass production techniques and economies are now being applied by The Lincoln Electric Co., Dept. BB, Cleveland 17, Ohio, to the reconditioning and rebuilding of arc welding equipment. The new rebuilding techniques are employed in a new operating division established by Lincoln as a result of studies undertaken by plant engineers following the company's move into its new \$10,000,000 plant. The new division of the company,



CHICAGO WHEEL & Mfg. Co.

Dept. MT • 1101 West Monroe Street, Chicago 7

called the Linc - conditioning division, with \$500,000 in space and equipment, utilizes conveyor lines and line operations to realize efficiencies in rebuilding welders, work which is normally done on a one-at-a-time basis.

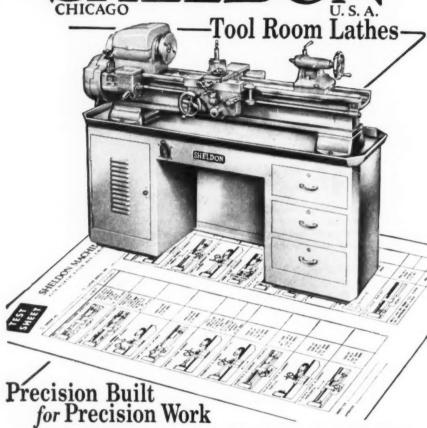
The new division will rebuild for users of Lincoln equipment their engine-driven motor generator and AC welders.

Jones & Laughlin Steel Corp., Pittsburgh, Pa., has opened a new Nashville, Tenn., warehouse covering an area of 40,000 sq. ft. Its regular stock on hand will be about 3000 tons. Resident manager is Louis R. Webb, formerly sales representative in Nashville.

Alpha Tool & supply announces expansion

The relocation of Alpha Tool and Supply Co. from Westwood, N.J., to Closter, N.J., has been announced by Donald Abrahamsen, president. At the new location larger facilities permit expansion.

SHELDON



Each SHELDON Lathe is a precision machine tool that in final inspection has passed the 19 accuracy checks on the SHELDON "Inspection Test Sheet."

Produced by modern

methods with the finest special machines, these 10", 11" and 12" (swings 13") lathes are quality built on a quantity production basis. Selling at quantity production prices they are today's best lathe values.

SHELDON MACHINE CO., INC.

4242 North Knox Ave., Chicago 41, Illinois

What's New

IN

METALWORKING

For Profiling, Milling Large Forgings

A MACHINE specifically designed for the milling and profiling of large forgings and castings such as aluminum and magnesium air frames, as well as cast iron parts and steel forgings, has been developed by Morey Machinery Co., Inc., Dept. BB, 410 Broome Street, New York 13, N.Y.

The Morey No. 40M heavy duty vertical "Aeroframe" profiler and milling machine is claimed to combine rigidity of construction with maximum power to take full advantage of tungsten carbide tools. It is equally useful for heavy cuts in irregularshaped steel forgings and castings, cast iron frames of computing. type setting and similar complicated precision machine parts.

The 40M has a twospeed 15 h.p. motor and operates through a

operates through a backgeared drive to provide a wide spindle speed range of 125 to 4600 r.p.m. Construction is such that vibrations



are minimized at the cutting tools.

Several significant design improvements are incorporated in this new

single-spindle, bridge-style profiler and milling machine. The cross head is mounted in balance on a vibration-damped cross rail. Bridge columns are designed for the addition of raising blocks to increase bridge clearance. Anti-friction bearings are used throughout the machine. A simple adjustment to take up all backlash in control gears enables the operator to control milling to very close tolerances.

Centralized one-shot lubrication simplifies maintenance. The Morey 40M

will not run unless the lubricator is operating, thus minimizing the need for repairs. A large coolant tank is built into the machine base.

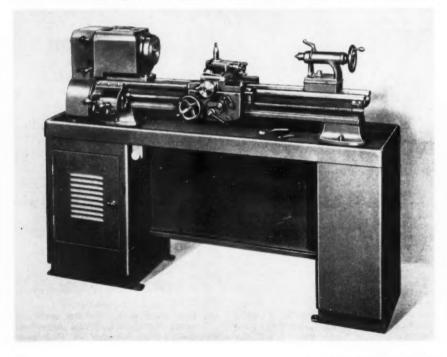
The profiler has both taper and straight follower holders. A lamp is built into the bridge. Both control arms are adjustable to suit the convenience of the individual operator. It can be supplied in any table length up to 10 feet. Copying attachments are available for any movements.

12" Logan Lathe Announced

Logan Eng. Co., Dept. BB, Lawrence and Lamon Avenues, Chicago, Ill., announces the new 12" Logan lathe. A heavy headstock; double V-belt outboard drive; massively proportioned, ball bearing mounted spindle; and a convenient, precision-built carriage are the new lathe's leading features. Indica-

tive of its capacity are such specifications as the 12" swing-over bed and saddle wings, 1" collet capacity, 1-3k" spindle hole, and center distances of 23" and 35".

The lathe is said to hog out heavy cuts, handle high speed production runs, and hold sensitive toolroom tolerances.



Auto-tap has variety of pitches

Auto-Tap, which is the new name for Automatic Methods lead screw tapping attachment, has a variety of split nuts and matching lead screws that are available in different pitches to suit a wide range of tapping requirements. It is made by Automatic Methods, Inc., Dept. BB, 42 Walnut St., Newark, N.J.

Solenoid pilot-operated valves

Valvair Corp., 989 Beardsley Ave., Akron 11, Ohio, announces a new, complete line of solenoid pilot-operated air control valves. They are available for 3-way, 4-way and 4-way 5 port (two pressure) application in pipe sizes ½" through 1". All types and sizes are furnished either for foot mounting or sub-base manifold mounting in accordance with J.Y.C. specifications.

All parts are non-corrosive. The main valve body, and also the sub-base, is cast bronze. The spool is stainless steel, hard chrome plated and polished to assure long life to the special Oring seals. There is no spring in the main valve, since air from the pilot valve is utilized to reverse the spool in both directions. The spool is the one moving part of the main valve body and, it is said, all parts are easily accessible without disturbing the piping to the valve.

The pilot valve control unit is manifolded with cap screws to the main valve body. An optional manual override is available for the pilot valve,



which makes operation possible when electric current is off or when cylinder control setups are of importance. All parts of the pilot valve are totally enclosed to give the complete valve a dust-proof and splash-proof protection.

All models are for air pressure from 35 to 150 p.s.i. and for low pressure oil hydraulic service. The 36" 4-way foot mounted valve is only 734" long by 434" high and 234" wide. Direct flow through the valve has been maintained to minimize pressure drop.

Relief grinding fixture

An improved grinding fixture that is said to incorporate all the essential features required for relief grinding of end mills, both spiral and straight flutes, countersinks, spot facers, center drills and reamers is announced by S & D Eng. Co., Dept. BB, 525 Commercial St., Glendale 3, Calif.

The rocking head permits drawing the cutter or reamer away from the wheel for indexing and retracting the



spindle. Tools are held in the spindle by collet bushings—ranging in sizes from 1/8" to 3/4", and 3/4" to 1". The second spindle or special collet bushing can be furnished by order for holding any type of cutter or center up to 11/4" diameter.

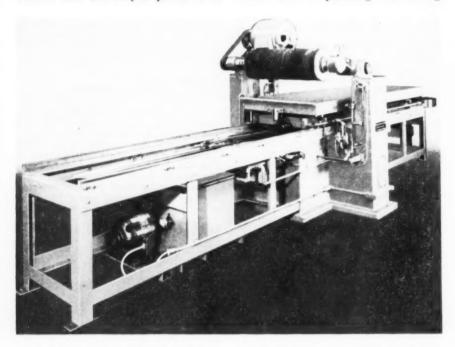
Two types of bases are furnished as desired, one is the hinged type for angular grinding. Both bases will swivel to any position radially.

Horizontal multi-purpose polishing machine

The Central Machine Works, Dept. BB, Worcester, Mass., announces the H-M series machine for polishing extrusions, sheets and rods as well as smaller and odd-shaped pieces. It is

hydraulic contour device. Contour cams are made of plywood and may be made up as needed.

The turn of a valve will oscillate table across face of polishing roll during



made in standard sizes from 7 ft. to 21 ft. stroke; is hydraulically operated with provision for obtaining dwell during the polishing action; and has an adjustable stroke with stepless increments from 2 inches up to the full capacity of the machine. It is equipped with

stroke. Series may be equipped with a mechanical polishing compound applicator or spraying equipment as required. Machine is standardized in sizes to take work from 6 ft. to 20 ft. long.

Power application to hand bender

The American Pipe Bending Machine Co., Inc., Dept. BB, 15 Furnace St., Poultney, Vt., is introducing the American Type 2PBR, designed for power application to their American Type A-30 hand bender, and engineered to

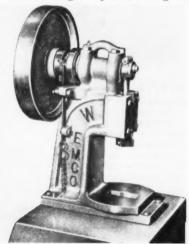
bend ½" to 2" U.S. standard pipe at radii approximately five times the pipe size up to 180°. It comes as a complete unit with standard motor and drum type reversing controller, with all rollers and quadrants for the fixed radius bends available within the capacity of this machine. The unit is



designed to handle up to 11/2" extra heavy and 11/2" double extra heavy. This capacity is claimed to cover a wide range in general use for maintenance bends, indirect heating, conduit bends, and for general plant and property maintenance where radii within the capacity of the machine can be used to eliminate fittings and speed up piping installations.

Emco punch presses improved

The Emco line of bench type power punch presses manufactured by Klaas Machine & Mfg. Co., Dept. BB, 4314 E. 49th St., Cleveland 9, Ohio, has been redesigned to afford increased die space or "window height" by eliminating the





Zagar gearless drillhead, 12", 24spindle; capacity up to 5/8" steel.

GEARLESS DRILLHEADS to Drill on All Centers

They (1) can drill practically any number of holes at one pass, up to 600 or more; (2) can drill any material; (3) can drill in any pattern; (4) can "come down to" distances between holes as small as twice the drill diameter; (5) can and do maintain accurate spacing. Zagar gearless drill heads can be furnished as complete units or can be adapted to any standard drill press. Your parts drawings and full data will bring you a prompt quotation.

Write for Engineering Manual "B-9"

ZAGAR TOOL, Inc., 24000 Lakeland Blvd. Cleveland 23, O.



TOOLS For



PERFORMANCE: Millit blade rigidity gives top performance—cuts longer between grinds—less carbide breakage—will take deepest and heaviest cuts.

VERSATILITY: Rake angles are built into the replaceable blades—same body can be rebladed for all types of service with H.S.S., Cast Alloy, or Carbide Tips.

PRICE: Millit design simplicity allows a replaceable blade cutter at prices lower than ever before.

DELIVERY: Production capacity has been geared to provide continuing favorable deliveries. Let us quote on your special cutter requirements from 4" to 14" diameter

WRITE TODAY
DISCOVER THE ADVANTAGES OF MILLIT



MILLIT, INC. 35 FLINT STREET Rochester 8, N. Y. radius in the column. Also, a new clamping device, consisting of a tool steel block and bolt, has been introduced in the ram, affording a more rigid grip and doing away with set screws. Emco presses, either bench type or stand-mounted, with or without motor drive, are available in two sizes. Emco "W" has a standard 34" and 14" standard stroke; Emco "X", 1½" and 2".

Field router bit grinder

The router bit grinder made by William H. Field Co., Dept. BB, 323-9 Dorchester Ave., Boston 27, Mass., is said to be a new approach for sharpening straight or tapered flute router bits, dovetail bits, three lip shaper cutters and similar tools.

Its primary purpose is to eliminate free-hand grinding in all sharpening operations. The functions are mechani-



cal and require no previous experience on the operator's part, it is claimed.

Grinding is done on the cutting face of the flute retaining the original shape and diameter of the bit, not on the periphery which would change the dimensions with each resharpening. The points or cutting ends are sharpened by swiveling the workhead to the desired angle or compound angle.

A feature is the carriage which has a 4" movement on ball bearings rolling in hardened, ground and lapped race-

ways.

Medium size spring tester

This new spring testing instrument manufactured by The Carlson Co., Dept. BB, 277 Broadway, New York 7, N. Y., tests loads and deflections of medium size compression and extension springs; it has a capacity up to 100 lbs.



The large 15" dia. dial is easily read it is claimed, and meets the National Bureau of Standards requirements for accuracy of ½ to 1%. This instrument is adaptable for both general purpose and high quantity production testing and has been used at the production rate of 400 to 600 tests per hour. Springs with diameters up to 4" and lengths to 12" can be tested.

lengths to 12" can be tested.

Steel rules measuring lengths in 32nds and 64ths on one side also measure lengths in decimals on the reverse side.

Band sawing machine designed for heavy duty cuteff work

A large capacity band sawing machine with wide speed range designed principally for rapid, heavy duty cut-



PLASTIC COATINGS for GEARS TOOLS PRECISION



Dip



Coated • Protected

DIP-PAK

Protect vital, expensive tools, gears, and machined parts during storage and shipping with Fidelity's durable, transparent plastic coatings. Merely melt coating briquette, dip parts, cool. Lasts indefinitely. Tough; abrasive, moisture, rust resistant. To remove, slit, peel. Re-melt, re-use coating. Economical, practical, rapid. Protect parts; save money.

Write for Bulletins and Free Samples FIDELITY CHEMICAL PRODS. CORP. 473 Frelinghuysen Avenue, Newark 5, N. J.

PARTS

off work is announced by the DoAll Co., Des Plaines, Ill. It is claimed to handle all kinds of ferrous or nonferrous metals and all shapes including plate, structural, ingot, slab, pipe, extruded or rolled forms. Zephyr Model CO-36 differs from conventional band sawing machines in that the saw blade is twisted 90° from conventional position at the work table so that the work is fed to the blade from the front of the machine. Consequently. length of stock that can be cut is not limited by the throat capacity as is the case when work must be fed from the side of the machine. It is also convertible to conventional high or low speed, straight or contour sawing; saw guides are simply changed to eliminate twist from blade and the table is moved into a neutral position.

Machine accommodates a 15½" work thickness under saw guides and 9½" thickness at column. The 40"x48" work table is hydraulically powered and is capable of handling work weighing up to 2,000 lbs.

Granite surface plates

Features claimed for the granite surface plates made by the Mojave Granite Co., Dept. BB, 1651 Miller Ave., Los Angeles 63, Calif., are: a superior quality granite used in their manufacture that gives durability without re-



surfacing; precision surface ground to 50 millionths inch in accuracy; frictionless movement; warp resistant; nonmagnetic; temperature resistant, etc.

These plates are produced from sources in California. The rough, uncut granite is fabricated and finished in its entirety in one continuous operation from its original state through the various processes to the finished product.

Available in sizes from 9"x12" to 48"x96".



Precision wet grinding finishes

Known as Grind-All, a concentrate used as a medium in grinding solutions, this product offers an improvement in wet grinding finishes. Manufactured by Stadoil Mfg. Co., Dept. BB, El Monte, Calif., makers of industrial and automotive lubricat-



ing, grinding and finishing products, Grind-All is designed and engineered to keep wheels open so that excessive pressure is not required for superior finishes—a saving in wheels, dressings and shut-down time for wheel dressing. Grind-All is a concentrate using one quart to each 30 quarts of regular grinding solution and is available in sizes from 4 ounce cans to 50 gallon drums.

New Verniers, calipers

Select carbon tool steels are said to be employed in the manufacture of new Vernier height gages and Vernier cali-







UNIVERSAL DRILL BUSHINGS in a complete variety of sizes and shapes

Universal Drill Bushings are produced in a complete range of standard sizes and lengths. Prompt attention is also given to orders for special dimensions. Universal Drill Bushings are precision machined with super finish bores to reduce wear and a blended radius to keep tool hang-up and breakage to a minimum. 100% concentricity and hardness tests insure absolute accuracy, uniform high quality, and long life. Write today for complete information.



The modern home of finer production tools

UNIVERSAL ENGINEERING COMPANY FRANKENMUTH 10, MICHIGAN

pers which are now in stock for immediate delivery in sizes from 12" to 48" by the Mercury Supply Co., Dept. BB, 410 Fairview Ave., Elmhurst, Ill.

Clear-cut, machine divided graduation lines, together with smooth-fitting slides and hardened, ground, and lapped measuring faces; readings are in 1/1000" by means of adjustable verniers.

Fly cutter for 3/16", 1/4" or 5/16" bit

Paul D. Rand Co., Dept. BB, 11337 Homedale St., Los Angeles 49, Calif., announces it is importing a small fly

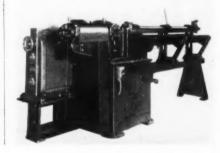


cutter from Germany, suitable to be used with either a 3/16", ½" or 5/16" tool bit. It is made out of one piece, for greater strength, with a half inch shank.

Variable speed drive wire cutting machine

The 1AV has been added by Mettler Machine Tool, Inc., Dept. BB, New Haven, Conn., manufacturers of Shuster automatic wire straighteners and cutting machines.

The 1AV features a variable speed



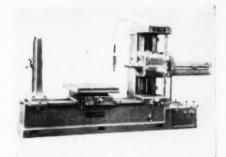
drive geared to feed infinite speed changes from 50 to 200 feet per minute. The one machine will handle both basic and spring wire. Diameters from 3/32" to 4" basic wire may be straightened and cut and, without further adjustment than turning the control handle of the variable speed drive, spring wire to 4%" diameter may also be run through.

The variable speed drive enables the operator to compensate for differences of temper, alloy and size.

3" Horizontal boring mill

Wotan 3" horizontal boring mills are said to be equally suited for toolroom or production use. The 31"x39" table top swivels a full 360 degrees and the machine is capable of 18 spindle speeds ranging from 17 to 910 r.p.m. Eighteen feeds are provided, from .001" to .500" per revolution. They are distributed by Parker Machine Co., Inc., Dept. BB, 158 Pioneer St., Brooklyn 31, N. Y.

Longitudinal feed and the cross feed can be read to .001". The mill is



equipped with power rapid traverse in all directions. The nitrided 3" spindle of the Wotan is hardened and ground throughout, also in the Morse taper No. 5. The face of the spindle sleeve conforms to No. 50 U.S. standard (ASA B5.18) for direct mounting of heavy cutter heads. The standard machine has a maximum distance from table top to spindle center of 29½". Higher columns can be furnished to provide for 35" or 43" vertical capacity.

Nicholson Air-Gas-Steam Traps

NEVER NEED PRIME

Nicholson weight-operated traps, under no condition, leak medium from a power transmission system. This prevents the costly loss of air, gas or steam occurring when inverted bucket traps lose their prime. Under such conditions Nicholson traps hold tight because they do not depend on buoyancy of float to raise valve. Three types; pressures to 1500 lbs.

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OVER LOAD INDICATOR

Look for the RED BAND

You no longer have to guess whether you are overloading your live center thrust bearings if you use MOTOR TOOL LIVE CENTERS. When the load is too great the RED BAND around the spindle disappears into the housing. You can see at a glance when overloading occurs. This is an exclusive feature, developed by Motor Tool which cuts repair costs to practically nothing if due diligence is exercised. As long as the RED BAND is visible you are running COOL and SAFE.

NEW descriptive folder . . . and verified case histories of how MOTOR TOOL LIVE CENTERS have out-performed and outlasted ALL other centers on exceedingly tough, centinyous-run jobs.

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DRILL-PRESS, MILLING-MACHINE VISES—strong construction, removable brass bushings, replaceable or permanent straight jaw faces, protected base. For medium and heavy duty.

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THE DESMOND-STEPHAN MFG. CO. Urbana, Ohio

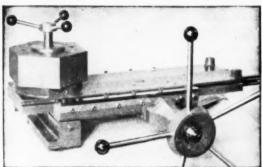
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Turrets available for smaller Lathes Write, or Phone ATIantic 7267

Only manufactures of

Alignment and Wear
Less Experience Needed

Only manufacturer of large conversion turrets.

LYNN MANUFACTURING CO.
1121 South Seventh St. Minneapolis, Minn.

NEW IMPROVED HAND SCRAPERS with just the correct spring

never before incorporated in any hand scraper



This new Hand Scraper, Model No. 5, is the most improved tool of its kind ever produced. Light in weight, easier to use with palm fitting comfort grip, faster cutting.

Rubber handle swivel pad, at small

extra cost, for those who place scraper handle against body for extra leverage. Three sizes: 18"—20"—22" long. Furnished with high speed steel or Carboloy Blades. Cost less than home made scrapers.

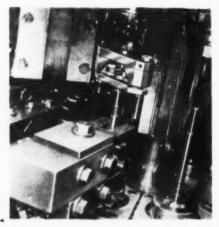


Write for Bulletin No. 9-5

ANDERSON BROS. MFG. CO., Rockford, III.

Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters, Hand and Power Hydraulic Straightening Presses. New design principle in Barnaby self-closing knurling tools

Operating on what is claimed to be an entirely different principle, Barnaby self-closing knurling tools are quickly set up for high-speed precision knurling behind shoulders or at any distance from the end of the work, on both automatic and hand screw machines. Their balanced design eliminates all transverse thrust, preventing bending of the



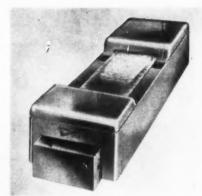
work and undue stress on the spindle bearings without the use of back rests. They are made by Barnaby Mfg. Co., Dept. BB, 74 Knowlton St., Bridgeport 8, Conn.

This tool does not require special camming or synchronization of the lead and cross slide cams, but operates directly off any pick-up cam—and no back rest setup is required.

With a slight variation it can be satisfactorily adapted to National Acme, Gridley and other similar multispindle machines.

Vacuum coolant filter

Automatic, continuous filtration of water soluble coolants for individual grinders, hones, and other machine tools is said to be provided by a new constant vacuum, endless belt filter developed by the Industrial Filtration Division of U.S. Hoffman Machinery



Corp., Dept. BB, 219 Lamson St., Syracuse 6, N.Y.

Called the "Vacu-matic" filter, the new unit provides automatic, self-cleaning operation, keeps coolant cool and delivers de-watered sludge for easy disposal. Because it employs vacuum, rather than gravity, the Vacu-matic is described as four times faster.

Two models of the Vacu-matic are furnished: one for flow rates of 20 g.p.m. and the other for 40 g.p.m.

Keller hack saw has 7" x 7" capacity

The new Keller No. 4 Hy-Duty power hack saw has a capacity of up to 7" x 7". The quick acting swivel base vise operates to a 45 degree angle and has a capacity of 4" x 7" at 45 degrees. It is being distributed by Sales Service Machine Tool Co., Dept. BB, 2363 University Ave., St. Paul 18, Minn.

Variable power pressure regulator provides blade pressure from 0 to 200 lbs. that is said to greatly increase the efficiency for cutting materials from lightest wall tubing to heavy shafting.

An adjustable foot lift helps hold saw frame in position while loading or unloading saw. This enables operator to use both hands for setting and starting.

This model has automatic lift on reverse stroke, adjustable bronze bearings for guide bar in saw frame, built-in coolant tank and pump, and is equipped throughout with Oilite bearings.



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How to get 100% more life from your diamond wheels

It's a fact that wet grinding will actually increase diamond wheel life as much as 100% through dediamond wheel life as much as 100% through decreased wear. Stadoil removes all gum or glaze-keeps wheels from loading and enables the operator to get extra fine tool edges without pressure. Stadoil is recommended by all diamond wheel manufacturers for carbide tool grinding. It is an excellent thinner for diamond lapping compounds and as a carrier for diamond dust. OVER 6,000 INDUSTRIAL USERS.... 18 years of industry service. Get Stadoil in ½ pint to 50 gal. quantities and see how Stadoil can cut your diamond wheel costs and increase tool life.

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STADOIL MANUFACTURING CO., EL MONTE 3, CALIF., U.S.A.

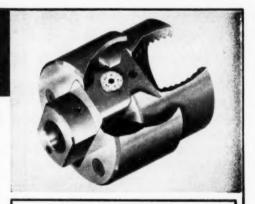
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THESE JOB-PROVEN FEATURES WILL SAVE YOU TIME AND MONEY

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Complete Boring Chuck **Accessories Available**

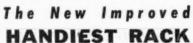
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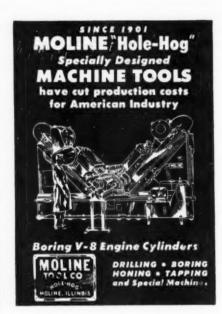


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4 arms 51" high 5 arms 57" high 13" wide

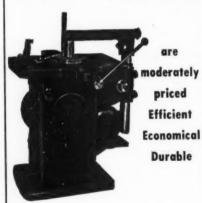
Make double racks by placing back to back These racks save 3/4 the usual floor and height space. Cost is small and only once. Remarkable capacity. Write for prices and information.

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"DAVIS" KEYSEATERS



Built in 3 sizes for cutting keyways 1/16" to 1" width. Circular upon request.

DAVIS KEYSEATER CO. 407½ Exchange St. Rochester 8, N. Y.

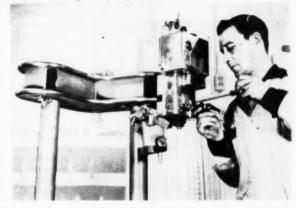
3-dimensional flame cutting equipment

The Milwaukee Shipbuilding Corp., Dept. BB, 3718 W. Lancaster Ave., Milwaukee 9, Wis., has placed on the general market "three-dimensional" flame cutting equipment for scarfing the edges of curved metal pieces in preparation for welded assembly of larger units.

The method is said to open the way for designing increased strength into curved metal structures made up of welded parts which themselves are curved.

The semiautomatic "3-D" equipment is said to speed up and make more uniform the preparation of welding joints, in comparison with previous hand held flame torch methods of scarfing curved pieces.

The flame cutting equipment is



called "three-dimensional" because it operates vertically, horizontally and at angles from the first two as it scarfs the edges of curved metal pieces. The third dimension is the operation of the cutting equipment around curves. The equipment centers on a flame cutter

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- Chrome molybdenum cranks, wrist pin connections.
- Easy to maintain economical to operate.
- 5 to 70 tons capacity.
- 9 models.

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Robinson presses are available (in either standard or air clutch models) in a complete capacity range, and all of them are fully described in our latest brochure which also includes detailed specifications. You may request a copy without incurring any obligation.

New Albany Machine Mfg. Co. New Albany, Ind. which moves under power as it follows the curves of the metal under process. The cutting flame slants at a constant angle from the desired apex of a scarfed edge.

Doctors' instrument cures production problems

An ingenious tube, used by physicians to examine inside a man's stomach, now aids inspection of machinery, dies and other products with cavities.

Just as the doctor inserts the gastroscope down the throat into the stomach, production men now place the tube along narrow passages or into molded cavities. The "Inspectroscope," product of Eder Instrument Co., Dept. BB, 2293 Clybourne Ave., Chicago, Ill., fits through a ½" opening. The thin tube contains a complex set of tiny lenses which reflect the image back and forth to the inspector's eye. A strong light illuminates the area looked at.

To fit around corners, a control wheel on the handle curves the tube so that almost all areas of a cavity can be seen. Often defects can be discovered



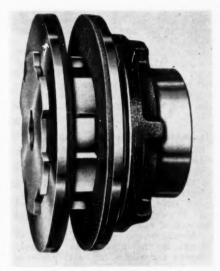
earlier in production. The part then can be perfected or discarded. Inside gun barrels, airplane wings, engine casings, and many other blind areas now can be examined with the industrial Inspectroscope.

Adjustable slip-type clutches

A new line of adjustable torquelimiting clutches that provide overload protection for machine drives in a wide variety of equipment is announced by Morse Chain Co., Dept. BB, 7601 Central Ave., Detroit 10, Michigan. These compact slip-type friction clutches act as automatic shear pin mechanisms and avoid the time and labor required to insert new shear pins.

The clutches consist of a steel body, two steel clutch plates, two friction disks, a Belleville clutch spring and a cast iron adjusting nut. The rotating member is held between the friction disks through spring pressure exerted on the clutch plates that slide on splines on the hub. The torque setting of the clutch is obtained by adjusting the spring tension with the threaded thumb nut.

The clutches are made in 41/2", 51/2",



and 6½" diameter sizes with ratings of 55, 121.5 and 260 ft-lb respectively. Maximum bores (with std. keyways)



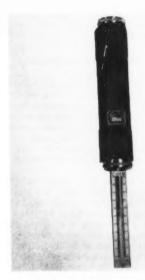
are 1", $1\frac{1}{2}$ " and $2\frac{1}{2}$ ". Over-all lengths are 2-9/16", 3" and 3- $\frac{3}{2}$ ". Hub o.d.'s are 2.000", 2.625" and 4.250".

The 4½" clutch will accommodate standard ½", %" and ¾" pitch Type A roller chain sprockets. The 5½" clutch will handle these sprockets as well as 1" pitch sprockets. The 6½" clutch will take ½", %", ¾" and 1¼" pitch sprockets.

Flo-meters added to line

Waukee Eng. Co., Dept. BB, 759 N. Milwaukee St., Milwaukee, Wis., announces a new line of flo-meters for the indication of flow rates of air and industrial gases. Available in 11 different sizes, each meter has its own built in calibration for the specific gas and rate of flow to be measured.

Measurements are easy to read as the oil in the glass tube not only dampens pulsations but also prevents the accumulation of dirt or foreign matter that might obscure the reading. Each meter has but one moving part, and cleaning can be accomplished in



less than two minutes without the use of tools.



Positioner for welding heavy parts

This new Leader welding positioner, Model P3000, is said to solve the problem of positioning heavy parts for welding. It is especially useful when used with automatic welding machines; made by Leader Welding and Mfg. Co., Dept. BB, 2418 6th St., Berkeley 2, Calif.

Both table and tilt are driven by a completely enclosed gear train. The



Acme-powered tilt has self-locking gears and can be swung through 120° from the horizontal position. Limit

switches are built in.

Constant-torque table speed can be varied from 0 to 1½ r.p.m. Higher speeds can be supplied if desired. Built-in dynamic braking eliminates coasting or over-running when the current is off. The table may be rotated through 360°, regardless of tilt position. Table direction can be instantly reversed. To eliminate backlash the table drive is powered by a spring-loaded worm gear. Finger-tip control of both table and tilt makes accurate positioning quick and easy.

Norgren pilot-controlled air pressure regulator

A new air pressure regulator has just been announced by C. A. Norgren Co., 3438 So. Elati St., Englewood, Colo., manufacturer of regulators, micro-fog lubricators, and other pneumatic products. It consists of a pilot-controlled



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POWER PUNCHES and SHEARS

Made in 7 sizes to meet practically every punching and shearing need. Standard equipment includes punching attachment, adjustable stripper, back gauge and shear blades for flat and round bars. Extra attachments available. You'll like the smooth, troublefree working efficiency of Beloit equipment. Send for details today.

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WHITTEMORE CO.
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air pressure regulator designed for extreme precision in air control over a wide operating range—from 2 p.s.i. to 120 p.s.i. with a capacity to deliver more than 200 c.f.m.

This pilot-controlled regulator utilizes regulated air pressure to control delivered air pressure, minimizing the effect of fluctuating line pressure as a factor in delivering uniform working air pressure. It is available in ½", ¾", and 1" sizes.



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Eliminates Separate Marking Operation

For further information ask for Bulletin NM 500-C

NEW METHOD STEEL STAMPS, Inc. 149 Joseph Campau, Detroit 7, U.S.A.

WHITNEY LEVER PUNCHES



This member of the line of Whitney Hand Lever Punches has a capacity of 1/4" hole thru 16 gauge iron. Packed in a heavy steel box with rack to hold 7 punches and dies. Built for hard service. Guaranteed to give satisfaction and to stand up when used within rated capacity. Supplied also in pasteboard carton with 3 punches and dies. Write for Lever Punch Catalog.

W. A. WHITNEY MFG. CO. 649 RACE STREET ROCKFORD, ILL

SAVE TIME

WITH BARTELT GAGES



Use a Bartelt Pedestal Micrometer for setting boring tools and for many other shop operations requiring accurate positioning relative to fixed base. Make settings in one step—eliminate cut-and-try methods. Model B, with reversible slide, shown. Write for literature describing all models.

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- . Hand threading.
- . Threading holes in angles, bars. rods, etc.
- . Champhering. deburring. countersinking. stud threading. reaming, spot facing, etc., etc.

A simple and rugged machine for A simple and rugged machine to tapping holes and cutting threads accurately and speedily by hand. With holding fixtures acrewed to With holding fixtures acrewed to the work plate, castings, stamp-ings, moldings and machined pieces can be threaded on a production basis. Rods, tubes, wires and studs quickly threaded by using chuck adapter and die. Easy to operate. Occupies 16°x18" bench space. Write for circular now!

HERB м. FIELD 417 N. Monroe St. Portland 12, Oregon

Torque testing fixture

The P. A. Sturtevant Co., Dept. BB, Addison, Ill., manufacturer of torque wrenches, announces a new torque testing fixture. A fully adjustable spindle set in instrument bearings is held in rigid alignment and permits rapid engagement of the driver with the work. The spindle has a female drive square to accommodate a wide selection of torque wrenches within the capacity of each of the two models. The driving



end of the spindle is threaded so that users may design drivers for special applications. A standard male drive square attachment is included with each fixture and is fitted to the driving end of the spindle. This permits using regular sockets, socket screw drivers, etc., without alteration. A T-slot base makes it convenient for a user to clamp nests and holder to the fixture.

Pocket comparator

The Edscorp pocket comparator for measurement and inspection of small parts and small dimensions is announced by Edmund Scientific Corp., Dept. 223. Barrington, N.J.

Dept. 223, Barrington, N.J.
Only about 1½"x2" in size, this imported comparator gives 6 power magnification. Its reticle is calibrated to measure angles, radii, circles and linear dimensions, in both decimal inches and millimeters.

Comparator can be used for checking layouts and machining on tools,



Metal Cutting Saws ... by Reltool

Precision Made: Reltool Circular Saws of various types are made by modern precision methods of fine, high-speed tool steels. Hollow ground to required tolerances, they are slightly concave for ample clearance to assure free running in deep cuts.

A Reltool Saw for Every Need: In addition to Plain Metal Slitting Saws, Reltool makes Metal Slitting Saws with Staggered Teeth and Side Clip Clearance, Screw Slotting Saws, Formed Tooth Saws, Fine and Coarse Tooth Tenacious Saws, Plastic Saws, and Circular Shears.

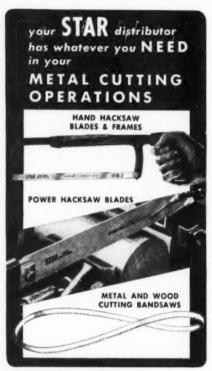
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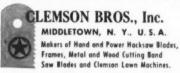
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dies, gages; or to check threads, chamfers, small holes; and in optical work for checking flaws such as bubbles, seeds, scratches, pits and digs.

Long & short of Vernier calipers

Calipers which range all the way from four inches up to a king-size fifteen-footer are manufactured by Alina Corp., Dept. BB. 401 Broadway. New York 13, N. Y. The fifteenfoot calipers are made for use with large jigs, fixtures, machine tools, dies, etc., and for manufacture of generators, turbines, tanks, airplane sections and assemblies. Spe-

and parts



tortion and alteration in length.

Microptic instrument measures plain and threaded gages

Through the use of a built-in 4" glass scale, the Microptic measuring machine (horizontal type) provides a means of measuring lengths or diameters of gages and parts to .00005" direct reading and .00001" by convenient estimation, according to Engis Equipment Co.



Dept. BB, 431 S. Dearborn St., Chicago 5. Ill.

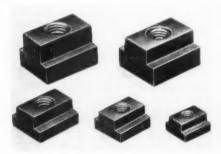
With simple standards of 4" length, it can be extended to a maximum capacity of 14" external measurement and 10" internal measurement. The work table is fully adjustable, including provisions for tilt and rotation. It is therefore possible to align the work piece quickly to check true maximum or minimum dimensions.

As no gage blocks or other length standards are required with each measurement, the machine is a self-contained unit for rapidly checking gages or pieces of varying size.

Mass-produced tee nuts

Tee nuts mass-produced in 15 sizes, to fit every machine tool application, have been announced by the Jergens Tool Specialty Co., Dept. BB, 712 East 163rd Street, Cleveland, Ohio.

According to the manufacturer, it is the largest range of sizes of tee nuts ever offered in the component parts industry, with throat sizes now available from 7/16" to 1\%", and makes it







THEY GRIND—NOT JUST RUB!

The RPM's stay up while grinding...not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind...not just rub. Every mechanic knows this, but an inexperienced buyer may order tools that maintain proper grinding speeds only when running idle. The speed of Kipp air grinders drops but slightly when put to work. That means better work... longer wheel life.

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207 Waubesa St., Madison, Wis., U.S.A.

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possible to fit any application such as table slots and automatic cross slides on milling machines, automatics, turret lathes, brakes, punch presses, shears, planers, etc., without resorting to custom making.

Balancer indicates to .000025"

Instead of picking up the vibration of a rotating piece and then calculating the unbalance through intricate electrical networks, the Trebel dynamic balancing machine, distributed by Kurt Orban Co., Inc., Dept. BB, 205 E. 42nd St., New York 17, N. Y., introduces a counter motion into the bearings in which the piece rotates until, it is



claimed, a smooth running condition is obtained. At this point the machine will indicate the magnitude as well as the location of unbalance in ounceinches to an accuracy within .000025" displacement of center of gravity. On more specialized work, indicators in any other desired units, such as the numbers of holes to be drilled or slugs to be added, may be obtained.

The Trebel balancing machine consists of a bed, headstock, drive motor and two independently movable supports. The latter carry open bearing rollers on which the work piece is rotated. The height of the roller brackets is adjustable to suit different work piece diameters.

Cold pointing machine has stationary dies

The Abbey Etna Co., Dept. BB, 3430 Maplewood Ave., Toledo 10, Ohio, has placed on the market a cold pointing machine which is built in four sizes



for the cold pointing of tubes and bars of steel and nonferrous metals up to 6" in diameter. There is said to be no possibility of the dies revolving the tube with risk of injury to the operator because the four dies are mounted in a fixed spindle head of nitralloy steel and are therefore stationary. A cage of annular rolls revolves around the spindle head, the blows being transmitted to the dies through hammer blocks. Inner track of the rolls is the

spindle head, the outer track being fixed in the flywheel.

Die wear is taken up by means of taper wedges between the dies and hammer blocks; wedges are adjustable from back of machine. Amount of die opening is controlled by parallel cotters inserted in the side of the hammer block and spindle head die slot. A stop, operated from the rear, is provided in order to control the length of point; adjustable guide is provided at front of machine.

Production tests indicate that steel tubes up to 2" in diameter can be manually fed into the machine by one man. Non-ferrous tubes up to 2½" diameter and aluminum tubes up to 3" diameter can also be pointed manually. For tubes above these diameters, a power feed is usually necessary.

Fluteless carbide tipped drill

A new type of drill has been developed by the Hayden Twist Drill Co., Dept. BB, 8626 Lyndon Ave., Detroit,





MALL TOOL COMPANY
7742 S. Chicago Ave., Chicago 19, Illinois

Mich., for drilling plastics and shallow holes in cast iron. The fluteless drill consists of a shank of drill rod between 50% and 60% of the diameter of the carbide tip. The shank and tip are joined together by brazing. It is claimed that due to the strength of the brazing alloy employed it is unnecessary to provide steel pockets or similar guides for the tip, leaving ample room for chips.

Drill is tested at the factory in cast iron with a feed of .003"/rev. The braze material built up around the tip is said to provide strength and rigid support for the tip. Manufacturer guarantees drill against failure of the braze. In the drilling of cast iron this drill is most successful in shallow holes. Holes beyond 1½ or 2 diameters deep should be drilled horizontally for obvious reasons. The drill is not successful on steel. It is manufactured in sizes from 13/64" to 11/16".

German lathe has 36 spindle speeds

The new Martin 501 lathe, by K. Martin, Offenburg Baden, Germany, is equipped with 36 closely stepped spindle speeds ranging between 12.5 and 710, 18 and 1000, 25 to 1400, or 35.5 and 2000 r.p.m. To each speed two additional speeds are coordinated. They can be preselected and engaged during the



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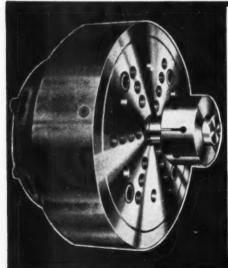


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cutting operation. This feature makes it possible to coordinate the cutting capacity of the tool, the properties of the material, and the size of the piece to be machined in the most advantageous manner. The ways go over the entire length of the bed to give the cutting tool rigid support when face-

plate work is being done.

The motor at the rear of the leg is coupled to a speed reducing gear equipped with electromagnetically-operated clutches. From this gear the headstock is driven over a set of veebelts. The headstock itself is fitted with two additional electromagnetic clutches controlling the forward speed, the reverse, and the brakes. The spindle is carried in pressure-lubricated plain bearings or in adjustable roller bearings when the spindle speeds are in the higher speed range. The quick-change gear box, which does not employ a tumbler voke, furnishes all the feeds and allows it to cut any desired metric or Whitworth thread. The lathe is made in six sizes with distances between centers varying between 40" and 160". The swing is 20" over the bed and 12" over the carriage. A 20" faceplate is furnished.

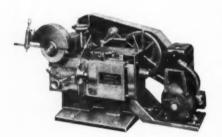
Driv-Lok stud

The Driv-Lok stud, designed to speed the attachment of light metal or plastic parts such as name plates, covers, brackets, etc., to heavier structural members, has recently been introduced by the Driv-Lok Pin Co., Dept. BB, 715 Chauncey St., Sycamore, Ill.

Requiring but light blows to drive



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the stud and secure the parts, the new fasteners are resistant to shock and vibration, yet can be easily disassembled without damage to the components. Three parallel grooves, equally spaced, are impressed on the shank of the stud, displacing a carefully determined amount of metal to each side of the cut to form a raised flute. When the stud is driven into a hole of the same nominal diameter as the shank, the flutes are compressed against the whole wall, holding the stud securely in place.

These are available in round, flat and countersunk head styles in lengths (under head) from \%" to \%" and shank diameters from .067 to .250.

Industrial diamond turner

The Industrial Diamond Co., Dept. BB, 2392 Wolcott, Ferndale 20, Mich., in cooperation with the Corr Instrument Co., announces development of an industrial diamond turner which is said to incorporate a new principle in rotation of the diamond. The electromechanical device automatically in-



dexes the dressing diamond by positive, precise increments. This action will continually present a new sharp diamond edge for each wheel dressing. Turner is compact, and is slipped into existing diamond holder of machine.

Adapt-A-Belt

The new Curtis Adapt-A-Belt, product of Curtis Machine Corp., Dept. BB, Jamestown, N.Y., is made for use as a portable grinder attached to an



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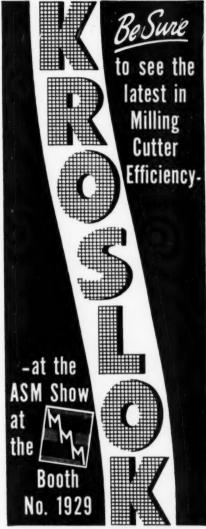
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Cutting Tool Manufacturing Division



715 Penton Building Cleveland 13, Ohio

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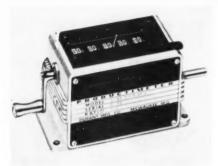


air outlet or to clamp on lathes, milling machines, drill presses or pedestal grinders to do work quickly on jobs that do not warrant setting up a machine. Dynamically balanced rubber covered contact wheels in various diameters, widths, and durometer, as well as soft or hard cloth wheels, are utilized.

Model A-1 uses abrasive belts up to 1" wide and weighs 24 lbs. Model A-2 will take belts to 2" wide and weighs 24 lbs.

Counter equipped with crank reset

The Durant Mfg. Co., 1928 N. Buffum St., Milwaukee, Wis., announces a



crank reset model in its new line of SP small predetermined productimeters. A modified form of quick lever reset, it is designed especially for coil winding machines, or other equipment where high-speed resetting is required. A turn of the crank brings totalizing figures to zero, ready for the next preset run. Both rotary and stroke models can be furnished with crank reset.

A major feature of SP counters is that the switch is not reset for the



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One machine does both—it sharpens pipe thread chasers at one end—and pipe and tube cut-off wheels at the other end. Keeps your tools ready for instant use—always sharp. Also, Manufacturers of Cut-Off Machines and Wheels.

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Corners stay sharp...provide positive non-slip wrench grip...No decarburized surface.

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SION LIVE CENTER designed to support the HEAVIEST load at HIGHEST speed for the LONGEST time!

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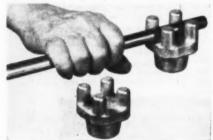


BALL BEARING LIVE CENTER

next run until all wheels are turned to zero. In many installations this means elimination of holding circuits, it is claimed. Switch resetting mechanism is designed to allow rotary models to subtract in reverse.

Greater leverage with bar knobs

Made of malleable iron and cadmium plated, these bar knobs are manufactured by Morton Machine Works, Dept. 71, 2421 Wolcott, Detroit 20, Mich., in two standard sizes, 21/2" and 31/2" dia.;



21/2" size-with holes reamed and tapped 1/2", 5%" or 3/4"; 31/2 size—with holes reamed and tapped 3/4" 7%" or 1".

These are now being furnished in addition to Morton's standard hand knobs in order to serve those who require greater work forces, locking pressures and leverage. Templates for tracing purposes available upon request.

Swedish dial indicator

Homestrand, Inc., Dept. BB, Larchmont, N. Y., distributors of the redesigned vernier height gage which features a special dial indicator attachment, is now making available an improved Vipp dial indicator.

Swedish made, it is said to be a pre-cision instrument of high quality and fine workmanship. It is adaptable for use with any height gage.

A lever on the side of the body reverses direction of movement of the contact point, which is equipped with a joint, permitting it to be set anywhere within range of plus and minus 90°.

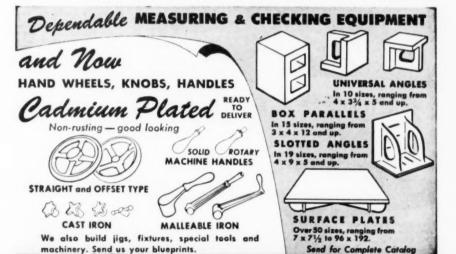




SMOOTH, accurate small-radius bends made quickly in pipe, tubing, conduit with Greenlee Hand Bender

Forming small-radius bends without flattening or kinks is simple, speedy work with a Greenlee Hand Bender. Ideal in the shop for pipe and tubing installations on machines . . . especially designed to form neat bends for sharp corners, nooks and other close quarters. Various models and sizes for steel, copper, brass and aluminum tubing or pipe, rigid and thin-wall conduit. Write for facts. Greenlee Tool Co., 2009 Herbert Avenue, Rockford, Ill.





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Dept. A

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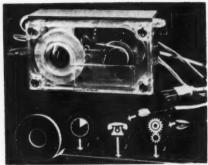
Detroit 12, Mich.



The dial is graduated in .001 with a range of plus or minus .015, and for easy reading, one half the dial is in red.

Time-rate recorded by monitoring recorder

A simple method of getting the answers to questions of "How many?" and "When?" is now said to be provided by a simple monitoring recorder announced by Alden Electronics and Impulse Recording Equipment Co., Dept.



BB, Westboro, Mass.

Designed primarily for the collection of information as to the number of actions occurring over a time period, the Alden magazine recorder prints and stores a tape record of two separate data traces plus a timing trace.

The recording tape consists of Alfax electrosensitive paper in which electricity is the ink. Machine operation and down-time, on-off current input such



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Prevents Injury — Saves Glave Costs Feeds ferrous, non-ferrous strip or sheet . . . faster, safer. Use for stamping, shearing. Right or left hand non-slip fitted grip, self-adjusting. Sturdy, hardened work surfaces. FULLY GUARANTEED.



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REAMERS IN Decimal SIZES

From .032 .033 .034 .035 all the way up-blanks can be ground to your exacting specifications, delivered in approximately 10 days. By purchasing SUPEREAM REAMERS in steps of .001 you save Time, Labor and Money in the cost of extra machining and lapping. SUPEREAM REAMERS all have ground and polished flutes and are held within .0002 tolerance.

REAMERS are also furnished in Right-hand spiral, right hand cut, as well as Left-hand Spiral, Righthand cut.

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Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money tool

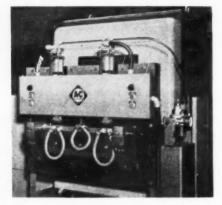
HEIMANN MFG., CO. ● URBANA, OHIO

as oil burner motors, valve opening and closing, voltage or other variations beyond set limits, door opening and closing, recording life tests of electrical apparatus, and counting store traffic are typical uses for instrument. Left unattended on a mountain top in one installation, recorders gathered eight days of weather information.

Two-station fixture permits two work coils on heaters

A new two-station, air-operated, electrically controlled fixture which is said to permit the use of two identical or two different work coils has been developed by Allis-Chalmers Mfg. Co., Dept. BB, Milwaukee, Wis., for its 10 and 20-kw induction heaters. Fixture provides two separate sets of bus bars to which work coils can be connected. While one work coil is supplying thermal energy to the metal parts being heated, operator can unload and reload the other work coil.

The control system of the two-station fixture prevents switching the radio frequency power from one coil to an-



other during the heating cycles. A timing system is used to insure only cold make and break contacts.

Designed to be bolted to the front of any standard Allis-Chalmers 10 or 20kw induction heater; but some of the early model heaters may require minor modifications, such as providing bolt holes.



Speed-reducing pulley for light drill presses

Three new models of its speed-reducing pulley, which, it is claimed, now makes it possible to drill efficiently up to 1%" in steel on light drill presses with only a ½ h.p. motor, have recently



been announced by the Pull-Gear Co., Dept. BB, 4118 E. 8 Mile Road, Detroit 34. Mich.

Each unit is now adaptable to three motor shaft sizes, ½", 5%", 3¼". This is accomplished by means of two reducing sleeves, 34" to 5%" and 34" to ½". This permits the units to be transferred to various machines with different motor shaft sizes. Previous models were adaptable to one shaft size only. Smoother and more quiet operation is claimed.

Threading unit

A Murchey "Precision Pak" threading unit is announced by The Sheffield Corp., Dept. BB, Dayton 1, Ohio. The new device is a fully automatic power unit with such features as direct precision lead, rapid return of the tool spindle, variable speeds, flexibility of application, and low cost of maintenance, according to the manufacturer.

The Murchey "Precision-Pak" has a hardened and ground spindle driven by a 3 h.p. motor. Precision lead is main-



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tained throughout the entire feed travel of 4" by a hardened and ground quick change lead screw and collapsible lead nut head which is mounted directly on the rear end of the spindle.

5000° carbon resistor-type tube furnace

Model CT-312 for ultra-high-temperaature work in the formation, fabrication or processing of ceramic materials or refractory materials has recently been announced by the Pereny Equipment Co., Dept. BB, Columbus, Ohio. It is claimed to be capable of rapid warm-up to 5000° F., reaching that temperature in approximately two hours. Even temperature zone of the tube furnace is 12" x 3" i.d., with a full heated length of 26".

Elements are water cooled and protected with electrical interlocks. The



entire furnace is automatically shut down in the event of water-flow failure to either or both the transformer or electrodes.

The new furnace may be equipped with either ignition-thyratron type (440/60/1) or saturable reactor capable of supplying power continuously variable from 1 to 100 per cent of connected load.

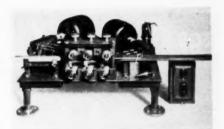
Provided with push-rod ports, this unit permits either continuous or "inplace" firing on predetermined sched-

The all-welded steel furnace is 23" wide, 60" high and 41" long, plus external fixtures.

Changes in rotary straighteners

Some changes in the various Model AYZ rotary straighteners for small-diameter rod or tubing, manufactured by Mackintosh-Hemphill Co., Dept. BB, 901 Bingham St., Pittsburgh 3, Pa., has been made in the machine's design and construction.

The three sets of identically con-



toured twin cross rolls are now made of hardened graphitic tool steel. Despite their diameter being only ¾", the company has been able to fit roll necks with needle roller bearings for radial loads, and ball thrust bearings for axial roll location.

All six rolls are driven by floating drive spindles, square instead of circular in cross section. In addition to eliminating the use of a key, the new spindles, fitted into broached square holes of the universal joints, allow for lengthwise slip due to angularity of rolls.

At its standard 70 feet per minute



The Redmer Foot Control and Valve reduces operator fatigue in all cases where air control is necessary. Valve is a brass casting which can be removed and used as a separate unit with cam operations. Foot Control No. FC-28. Valve No. V-29.

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REDMER AIR DEVICES, INC.

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WORK HAND IN HAND



- A.S.A. standard and special drill jig bushings,
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- Gages salvaged by hard chrome plating.
 Write for bulletin and price list.

Economy TOOL & MACHINE CO.

1829 S. 68TH ST., MILWAUKEE 14, WIS.

production speed, the straightener's six rolls are now actuated by two 3-phase, 1/6 h.p. at 3600 r.p.m. motors; 220-440 volt. The change from single phase motors is said to assure ample starting torque under load.

Taper attachment

The Dow taper attachment developed and manufactured by Associated Engineers, Inc., Dept. BB, Box 1628, Springfield 1, Mass., is said to utilize and improve the taper turning ability of standard turret lathes, using the combined feeds of the hex turret and cross-slide.

Attachment consists of two units. The first is a roller bracket, which is mounted in the square tool turret or on the cross-slide; the second, and most important unit, is an adjustable cam, mounted on a holder, fitted to the standard hex turret and is so located as to allow the cam to contact the roller in the tool post.

The first step in turning tapers or angles is to select the cross-slide and hex feed which will most nearly produce the desired angle. The second step is to adjust the cam to compensate for the difference between the angle which the machine can produce and the angle to be cut.

As the two feeds are engaged simul-



MACHINE and TOOL BLUE BOOK

taneously with the cam in contact with the roller, a rolling action results. This changes the lateral movement of the tool while the cross-slide travel remains constant, thus increasing or decreasing the angle between the axis of the work and the path of the tool, depending on which direction cam is rotated.

Acra-ment comparator

This new Model TD-5 bench comparator by the Acra-Ment Gage Div. of the Meyer Corp., Dept. BB, 633 Park Ave., Cranston, R. I., is a general purpose gage adaptable to numerous uses in the machine shop, toolroom, and inspection departments, the manufacturer

claims.

The gage measures height, thickness, depth, ct'bore depths and diameters, and offsets. All these measurements are possible by using the over and under convertible feature of the column and indicator position in reference to the platen surface.





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CUTS, BENDS, PUNCHES

Available in hand or air operated models, the MULTIFORM is shipped complete with full assortment of dies and mandrels to punch, bend and cut round or flat brass, bronze, aluminum, steel, etc., up to 4 % 1 ½ % as illustrated, other models up to ½ " x 4".

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IMPROVE FACING OPERATIONS

M-D Facing Head feeds automatically. Lathe tool bit travels radially, from center outward or reverse. 10 sizes 6" to 46" dia. Write for Bulletin, Prices.

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VED VISES
We make a complete
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grinders. Illustration shows our standard milling
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No. 20—10" jaws, 21/4" deep, opens 81/2"
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Best material and workmanship. Prices are net f, o. b. Chicago. Dealers' inquiries are solicited. Write for folder TODAY.

J. E. Plunket Machine Co. 3230-32 Archer Ave.

Adaptor Nut

The adaptor nut of Hall Mfg. Co., Dept. BB, 622 Tularose Dr., Los Angeles 26, Calif., is made to adapt the Hall model B-2" collet chuck to L-00 taper spindle lathes.

Hall push-out type collet chucks are said to have the advantage of maximum over capacity with positive automatic adjustment. They have no latches, fingers, cams.

dogs, locks or other irregular parts. It is not necessary to stop lathe to reset work as the Hall chuck is opened and closed with a slap of the hand while the lathe is running full speed.



The new Dril-O-Driver, product of the Drilo Corp., Dept. BB, 201 East Carson St., Pittsburgh, Pa., is said to convert all electric drills into speedy





impact screw drivers. Fifty-four ¼" drive standard tool accessories are now on the market for use with electric drill and Dril-O-Driver unit. The connector furnished with every Dril-O-Driver is the key to using all fifty-four ¼" drive standard tool accessories. Wrench manufacturers offer these fifty-four ¼" drive sockets to drive hex and square nuts, Phillips, Clutch, Allen, Reed & Prince, wood and metal screws. Dril-O-Driver cone drive construction



'Special Machine Tool Builders"



Illustrated above is a Model 4M unit with spindle travel of 6" and 120 r.p.m. This unit has a 6½ second duty cycle.

For detailed information regarding the application of the Fen Automatic Wrench to your machines, phone, wire or write. Do you want a compact, self contained wrench to operate gripping fixtures on your machines? If so, contact the:

FEN

MACHINE COMPANY 28914 Lakeland Blvd. Box 274 Wickliffe, Ohio

"GRIND IT IN A **MINIT**"



The NEW MINIT CUTTER GRINDER. Featuring Hardened Table ways riding on Ball Bearings. Tilting-Wheel Head with Full Universal Equipment. Spindle greased for life. Available in floor or bench models. Low price. Early Delivery.

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CUTTER GRINDER CO.,

19 Stewart St. Lynn, Massachusetts

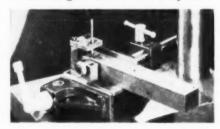


permits the operator to control the force and speed of the Dril-O-Driver from 0 to full speed of the electric drill.

Safety vise announced by AMF

A new instant change safety vise has been announced by Wahlstrom/Float-Lock Sales, Dept. BB, American Machine & Foundry Co., 511 Fifth Ave., New York 17, N. Y., which is huskier than the previous model and has three bosses for easy jig attachment. Any number of holes can be drilled without removing the work, as the vise turns over on three sides for drilling flexibility.

Manufacturer claims it locks securely by a quarter turn of the "T" handle, at any position on the table, thus making it a dependable drill jig when duplicate pieces are required. The work is locked or released by a flick of the hinged handle which operates

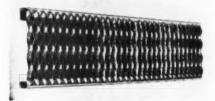


the screw jaw. When not in use, the vise can be swung out of the way; choice of either a 9" or 12" jaw opening.

Safety Grip-Strut in five widths

Safety Grip-Strut, safety grating manufactured by The Globe Co., Dept. BB, 4000 S. Princeton Ave., Chicago, Ill., is now being offered in two new widths.

The two-diamond piece is 4-34" wide and was developed for ship ladders.

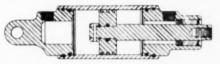


engine room steps, safety step ladders and stair treads. The eight-diamond piece is 19" wide and was developed for work platforms, catwalks, landings, flooring and miscellaneous use. Other sizes are 4¾", 7", 9½", 11¾" and 19".

Improved key type Hydraulic cylinders

Carter Controls, Inc., 2906 Bernice Road, Lansing, Ill., announces the development and production of a new improved key type hydraulic cylinder.

The mechanite rod bearing is long, providing a full one to one surface for extra wear. Chevron type packing is replaced easily and the whole bearing



insert is held by inserting a locking snap ring at the rod end.

This design permits the cylinders to be the smallest in diameter and length at no sacrifice in strength, in fact this design is said to permit a safety factor of 6 to 1 in all bore sizes.



YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

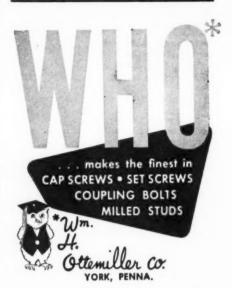
Offered in two sizes.

Vise No.	Width of Jaw, Inches	Opens Inches	Weight Pounds
1D 2D	31/2	31/2 51/2	121/2

Do you need a vise of ANY type?

Write today for bulletins on the extensive Yost line

YOST MFG. COMPANY 1335 SO. MAIN STREET MEADVILLE. PENNSYLVANIA







- SQUARE BLADES Easily Replaced.
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MACHINE WORKS 182 SIGOURNEY ST., BROOKLYN 31, N. Y

NEW PRECISION DIE SAWING & FILING MACHINE

The FM-200 Precision Die Filing & Sawing Machine has been designed for the small and intricate dies. Only tension files are being used. They are held under tension between upper and lower file helder arm guaranteeing absolute straight filing or sawing. The upper arm is hinged to enable the operator to awing the arm upward in order to Inspect the die. This way the file—which is fastened in the



CEDAR-WEST TOOL CO., Inc. 90 WEST STREET NEW YORK 6, N. Y.

Hydraulic broaching machine

A vertical internal pull-up hydraulic broaching machine in sizes from 6 ton capacity, 36" stroke to 30 ton capacity with 60" stroke has been announced by Acme Broach Corp., Dept. BB, Milan, Mich. Machine illustrated is the V-20-60 having 20 ton normal capacity, 24 ton

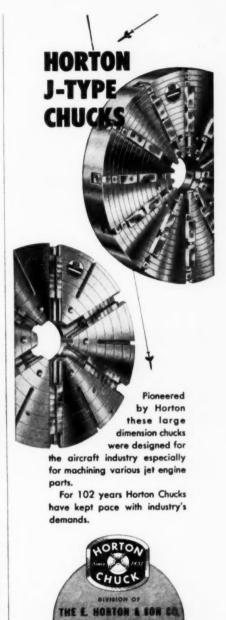


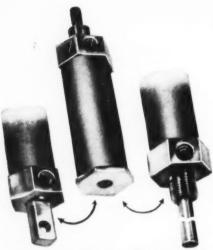
maximum capacity and 60" stroke for handling broaches up to 66" long.

Machines are said to feature adjustable cutting speed and quick, convenient stroke adjustment; two control lever arrangement requires use of both operator's hands as a safety feature and also provides a sensitive "feel" to the operator. Machines can also be supplied with electric controls if desired.

J. L. E. air and hydraulic cylinders

A complete line of air and low-pressure hydraulic cylinders has been announced by the James L. Entwistle Co., Dept. BB, Providence, R.I. Eastern sales are under the management of Sandersen Sales Service, Dept. BB, 3013 Dixwell Avenue, Hamden 18, Connecticut. Bore sizes range from 1½ to 14" inclusive and standard length of stroke may be obtained up to 84". These cylinders are reported to be of the





heavy-duty type and feature square heads machined from solid steel. Dirt wiper seals and high-tensile strength stainless steel piston rods are said to eliminate costly repairs or maintenance. The barrels are made from non-corrosive hard drawn seamless brass. The piston cups employ oil resistant composition material, with a hard non-compressible center and flexible edge. The piston assembly is said to be held absolutely square with the cylinder walls. A self-regulating gland packing forms a leak-proof seal ahead of a bronze piston rod bearing.

Standard mounting brackets include leg or foot mountings, front or rear flanges, clevis mounts, pivot ends. Cylinders are available cushioned at rod end, at rear end or both. The cushion retainers are built flush into the heads so as not to protrude, which enables the user to orient the ports at 90° to each other for piping in different planes. The square head design is said to facilitate close center mounting in multiple installations. Double rod end cylinders are also featured in this line.

Explosion-proof limit switch

A new explosion-proof heavy duty precision limit switch, designed for use on all types of machinery and indus-



GAIN EFFICIENCY . . . SAFETY . . . ECONOMY

"IMPAX" HAMMERS with specially designed shot-loaded head, strike controlled "stay-put" blows . . their mighty impact cuts one blow out of three. Spark-proof surfaces eliminate fire and explosion hazards . . non-chipping prevents worker injury from flying particles.

For Over Ten Years Industry Has Specified "Nuplaties Only"... NUPLAFLEX TIPS by actual performance records, have reduced costs 50% to 90%... and more. They possess a toughness, resiliency and self-healing quality not available in other hammers. Comparative on-the-job tests prove NUPLAFLEX often outwear rawhide, rubber, babbitt, lead, copper, wood and ordinary plastic materials at least 20-30 to 1 (actual proof furnished on request).

Make Your Own Test . . . You Will Be Amazed . . . For complete information on NUPLA and IMPAX HAMMERS, also NUPLAFLEX TIPS write your dealer or

NEW PLASTIC Corporation 1026 North Sycomore Los Angeles 38, California



trial equipment in explosive gas or vapor-air atmosphere, has been devel-

oped by the Micro Div. of Minneapolis-Honeywell Regulator Co., Dept. BB, Freeport, Ill.

It is listed by Underwriters' Laboratories as suitable for hazardous locations of Class I, Group C and D.

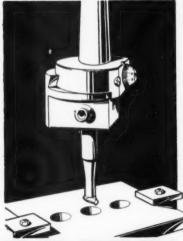
The new switch, designated IMLI-EI, is made so that the user may adjust the operating head to any of four horizontal positions. The roller arm assembly may be reversed to position the actuator roller on either side of the actuator arm. The roller arm is field adjustable to operate clockwise, counter clockwise, or in both directions. The actuator arm assembly is adjustable through 360 degrees to any of 870 positive lock positions at intervals of 0.4 degrees.

Including the adjustable head, the switch case measures 6" high, 21/8" wide and 1-61/64" in depth.

Blow gun meters air pressure

A new blow gun, designed with throttle valve that meters air pressure with finger-tip control, is an-

CARBIDE BORING TOOLS





three DISTINCTIVE STYLES

- · for boring
- · for facing & bottoming
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ALL WITH SOLID CARBIDE HEADS

Most standard sizes in four popular carbide grades are

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tant. Finishes to extremely close tolerances are produced.

The perfectly flat surfaces of sliding and rotating parts, air and liquid tight seals, plastic and die casting molds are quickly accomplished with this machine tool.



For cylindrical lapping, giving an accurate, mirrorlike finish in less time than any other method. Ideal for plug gauges. Saves as much as % in lapping time.

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2933 N. Pulaski Road, Chicago 41, ill.

mach as /3 m mbbing come.

nounced by the Aro Equipment Corp., Dept. BB, Bryan, Ohio.

Operator can regulate flow of air at



any desired rate—from a whisper to a blast—by pressing the throttle valve. Valve can also be set for fixed pressure.

Nord di-profiler works carbide dies

Tungsten carbide dies can be repaired, altered and even produced from blanks of pre-sintered carbide by using the new Nord Di-Profiler, a product of Nord International Corp., Box 44-N84, Denville, N.J., according to the manufacturer.

The Nord Di-Profiler is said to be vibrationless, even when used at long stroke which may be adjusted from 0" to 250".

For repairing or working carbide dies, a wide variety of diamond files are available in standard and special shapes,



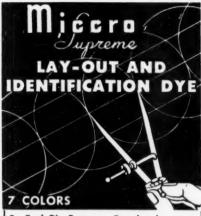
MACHINE and TOOL BLUE BOOK



HAND - CUT STEEL STAMPS AT MILL SUPPLY HOUSES



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For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheets, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

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DON'T SCRAP IT!

Ever have a tap or drill break in an expensive part? . . . so that even careful drilling couldn't save it? Today, parts costing as little as 50c can be economically salvaged by an Elox Electron Drill.* They're real money savers! No plant can afford to be without one. Write for particulars.

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in addition to a complete line of burs in round, inverted cone, straight (crosscut), taper (crosscut) and other standard or special styles. Special holding fixtures for holding stones in a wide range of abrasive qualities for other work are also available at Nord in addition to the stones themselves.

Dial color applying machine

A machine that applies color to machinery, instrument, clock and television dials has been developed by The Acromark Co., 546 Morrell St., Elizabeth, N. J.

In bench type, hand operated and also in foot, power and motor driven models, like a printing press it utilizes an inking roll and revolving platen.

The printing plate, or die, is made of synthetic rubber Acroprene. Dies are molded to exactly match the numbers, letters and design of the dial; they are vulcanized and bonded to a metal plate. In operation operator moves the top handle forward in a rocking motion to pick up the color;



then on the return stroke the impression is made in the number of the dial. Manufacturer claims that twenty to fifty dials can be filled a minute.

REHNBERG-JACOBSON INDEX UNITS



Complete Index Units have the new "Rim-Ball" table that will support enormous weight, and are made in 16" to 42" sizes for 3 to 12 indexes.

These units are all available for quick delivery. You can mount them on structures of your own to make practical and efficient production machine tools.

REHNBERG-JACOBSON MFG. COMPANY

DESIGNERS & BUILDERS OF SPECIAL MACHINERY



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MARK and DEMAGNETIZE ONE OPERATION



The Luma combination etchtool and demagnetizer etches, demagnetizes, anneals and solders. Permanently marks hardest steel with ease of a pencil.

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your product is your signature; keeps it neat and legible! Accurate location and alignment are assured

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SIMPLEX-M ABRASIVE BAND GRINDER



The precision of a machine tool plus the durability of a workhorse. Complete with 1/2 H.P. Heavy Duty Motor and auto-

matic band tension control. Nothing like It for finishing metals, plastics, wood,

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OIL-GASES-

1/8" to 111

automatic holds setting positive relief

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3438 So. Elati St., Englewood In Colorful Colorado

Auto reverse tapping head

The new universal joint adjustable auto reverse tapping head of Errington Mechanical Laboratory, Inc., Dept. BB, Staten Island 4, New York, has the reverse built right in the head.



or four holes in any pattern from 11/16" centers to within 5¼" diameter circle for tapping 0 to ¼". Head is said to be ruggedly constructed with aluminum castings. Gears, spindles and shafts are one piece, hardened and ground.



A new line of multirange, allpurpose test chambers, said to be capable of producing low temperatures to -130° F., high temperatures to 200° F.





and a standard humidity cycle of 20% to 95% from +35° F. to +185° F., has recently been introduced by Murphy & Miller, Inc., Dept. BB, 1326

COOLEY HEAT TREATING FURNACES

For Tools and Small Parts

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THE COOLEY FLOOR MODEL for HARDENING AND TEMPERING



Max. Temp.	Sizes	Price
2000°	12" x 8" x 18" 12" x 8" x 24" 12" x 8" x 36" 15" x 12" x 30"	\$985 to \$1350

All prices are less controls. Any standard controls available for automatic temperature control.

- With Cooley design, the door is virtually another wall, equally insulated with the others—entire hearth is usable.
- Natural thermal convection.
- · Easily removable heating elements.

Controlling Pyrometers carried in stock — available for all applications.

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COMPLETE CATALOG

"SHOP NOTES ON HEAT TREATING"

COOLEY

ELECTRIC MANUFACTURING CORP.
36 SO. SHELBY . INDIANAPOLIS, IND.

South Michigan Ave., Chicago, Ill.

These new units are made in five sizes with test space capacity from 4 to 36 cu. ft.; high capacity, low velocity forced air circulation system provided by a fan whose motor is mounted outside the cold test space. Cabinets are heavily insulated with non-setting, low conductivity material.

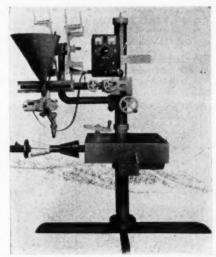
Mir-O-Col automatic rebuilder

The production of a new automatic rebuilder, the K-2, has been announced by the Mir-O-Col Alloy Co., Dept. BB, 312 North Ave. 21, Los Angeles 31, Calif.

It is said to enable shops to rebuild wheels, pulleys, track rollers, idlers and cones faster, better and at a fraction of new part replacement cost.

It handles work of any size up to 40 inches in diameter, and welds 30" of bead per minute. The K-2 takes all types and sizes of automatic wire up to 1/4" in size.

Distinctive features of the K-2 include: adjusting wheel which permits fine vertical adjustments of 1/64", fast



simple lock on centers prevents slippage and insures perfect concentric build-up, gear reducer on motor for

People work better when they SEE BETTER



At SKF Industries, Inc.

Magni-Focuser helps in conversion of wire into "points" for ballpoint pens.

MAGNI-FOCUSER'S

matched prismatic lenses give needle-sharp magnification. Comfortably light welght. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

MAGNI-FOCUSER SPEEDS PRODUCTION

Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Magni-Focuser can help your plant produce better. Immediate delivery, 10-day trial without obligaiton, Return to us if not satisfied, \$10.50.

Send for descriptive folder

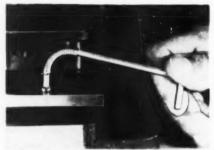
Gives true third-dimensional ("3-D") vision

EDROY PRODUCTS CO. 48.0 Lexington Ave., Dept.14, New York 17, N. Y.

variable spindle speeds from ½ r.p.m. to 3 r.p.m., easily adjustable welding table, large capacity flux can, and bar guide to keep flux around arc.

Flexible wrench for sockethead screws

A flexible wrench for hexagon socket-head screws, which is said to



turn' screws easily in hard-to-get-at places, is announced by Aetna Mfg. Co., Dept. BB, Bensenville, Ill.

The spring connection between both

members acts as a universal joint, enabling mechanic to start or remove screws in close quarters which otherwise would require removal and insertion of the wrench at each fraction of a turn.

Wrench is not intended to tighten or loosen the screw from or to its seat. The angled end, as usual, is used for those purposes. Made in sizes to fit screws from No. 6 to 5/16 cap screws and from No. 10 to 7/16 set screws. Five wrenches to the set.

Automatic air feed, ejector and marking arrangement

A new air operated assembly, combining the feeding of parts, the actual marking of them and then the ejection, automatically, has been developed and added to the Series 9AA marking machines produced by the Acromark Co., 546 Morrell St., Elizabeth, N. J.

Operated from standard air lines and requiring only 75 p.s.i., this new arrangement is said to provide essentially automatic production marking on plas-





SOMERSET RADIUS DRESSER

FOR SURFACE GRINDERS

Now you can cut production time without sacrificing accuracy. The new Somerset Radius Dresser is easy to set, easy to set, easy to see and eliminates necessity of guard removal. "Tricky" jobs become routine operations when Somerset is employed. Write today for free fact-crammed folder and prices. No obligation.

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SOMERSET TOOL CO. 2200 VIRGINIA HILLSIDE, N.



NO LOST TIME FUMBLING WITH LOOSE WIRES

The Scully 3 Wire Holder features a cail spring securing the single thread wire. The spring allows the single thread wire to assume the Helix engle of the thread, and to maintain parallelism with the double wires . . . measures up to 3" diameter with standard wires. Each holder has accurately spaced slots for one American Standard pitch only: 32, 28, 27, 24, 20, 18, 16, 14, 13, 12, 11, 10 threads per inch.



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SCULLY MACHINE COMPANY 62 WALTER STREET BRIDGEPORT & CONNECTICUT

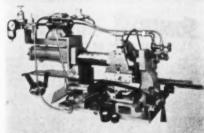


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- 800 light cuts per hour.
- Either horizontal or vertical position. Collets changed instantly. Automatically knocks piece out.
- Ratchet or degree indexing degree in-dexing added later if desired. Ca-pacity i".
- 6. Automatic indexer also added later.

 Model F.—Both degree & ratchet indexing. Capacity up to 21/4".
- Write for Folders. J. W. DEARBORN, Ansonia, Conn.



tic, metal or parts of other material. For plastic marking of tubular, cylindrical or round objects the parts roll down an inclined runway, are fed under the marking die by air pressure, then are marked by a roll leaf or color

transfer tape and ejected.

Over-all dimensions of the marking

machine with this assembly are approximately 30" long x 21" high x 14" deep; furnished ready for bench mounting, or a pedestal type of base is provided.

Hypro portable pump with vacuum switch

A new portable pump incorporating a special vacuum switch to guard against "burn out" when the liquid supply runs dry is claimed by Hypro





ommander MFG. CO.

12301/2 W. KINZIE STREET . CHICAGO 24, ILLINOIS

Write FOR
CATALOG #851
which describes Commander's





Chip Breaker Chips

Production Tools

Engineering, Inc., Dept. BB, 404 N. Washington Ave., Minneapolis, Minn.,

pump manufacturers.

Recommended by the makers for industrial, farm, marine and home use, the Hypro portable pump weighs 27 lbs. and has a hinged carrying handle. It will lift water up to 10 feet unprimed, 22 feet primed, and has outside threaded ports for female garden hose couplings. The unit's design eliminates need for a base plate or special coupling between pump and motor as the pump has a hollow shaft that slips directly onto the motor shaft. Capacity is up to 5 gallons per minute with pressures up to 30 lbs. It will handle liquids ranging in viscosity from alcohol to syrups.

A vacuum switch automatically stops the motor when the liquid supply runs dry, eliminating the danger of burnt out

impellers.

Broaches for special applications

The duMont Corp., Dept. BB, Greenfield, Mass., announce broaches for special purposes; economy to the user

is said to result, together with pre-

Special broaches are limited to those having cutting sections of 20" or less, over-all length of 36" or less, and square broaches no smaller than 4" across flats. Shown are: (1) pull-type





FOR BETTER MARKING

Use Imperial Marking Dies

The highly accurate, and precision made Supreme Chuck, manufactured by the Supreme Products Co., Chicago, must have the same top quality marking. Imperial Marking Dies give fine detail, accurate marking, and the long life

so necessary when marking on this tough alloy tool steel.





Imperial

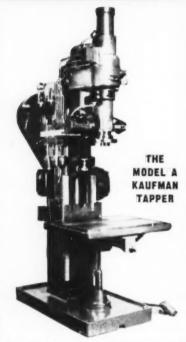
STAMP & ENGRAVING CO., INC

4456 No. Western Ave.

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KAUFMAN TAPPING MACHINES



Kaufman has specialized for many years in the building of tapping machines. Every machine is precision-built to meet the requirements of individual production jobs. Built with fully automatic cycle, single or multiple spindle heads and other most advanced features.

Send prints and sample of your work for further information and recommendations on how Kaufman Tapping Machines can reduce your production costs.

Catalog Number 1153 mailed on request

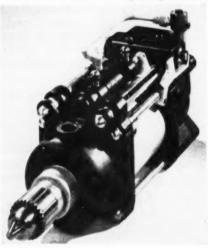
KAUFMAN MFG. CO.

547 SOUTH 25TH STREET MANITOWOC, WISCONSIN broach for sizing width and depth of slot in one operation; (2) pull-type, keyway broach, single pass; (3) another pull-type, sirgle pass keyway broach; (4) keyway broach for use in Davis and similar type keyseating machines; (5) push-type square broach, with round pilot; (6) push-type broach for squaring both ends of elongated hole in one operation; (7) push-type production keyway broach, self-supporting, for single-pass operation; (8) push-type square broach, with round pilot; (9) push-type broach for sizing four sides of rectangular hole in one operation.

Automatic air drill

The 30 lb. Holomatic drilling unit, product of Hause Engineering, Dept. BB, Montpelier, Ohio, accomplishes single and multiple feed rate operations. Powered by compressed air, hydraulically fed, it is suitable for automatic or manual cycle control.

Stroke is adjustable to 4" with ample thrust for ½" diameter drilling in steel. Positive stop with a dwell or instantaneous retract operation; continuous cycling, skip drilling, back feeding and manual jogging are said to be easily achieved. Rotary air motors available to ¾ h.p. and speeds of 500 to 15,000 r.p.m. give Holomatic wide working range. Drill units can be mounted in horizontal, vertical or angular planes.



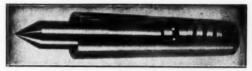
"Nirol" Needle Bearing Spring Loaded Live Center

- ACCURATE
 - COMPACT
 - . DEPENDABLE

The most compact and rugged live center for its size. Minimum overhang adds to rigidity and machine capacity.

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The STEVENS Line

SINCE 1925

Showing 7½" Dial Type Rotary Table mounted on compound table No. 1

- Traverse and Circular Movements -



Made in larger size 12" dial type Rotary compound table No. 2. Either unit usable
separately. Five sizes of Rotary Tables.
Adjustable tilting tables. Multiple spindle
index centers. Screw head slotters. Vises.

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The JOHN B. STEVENS Company

The LINLEY JIG BORER

Put your small jig boring jobs on this precision machine

Here's a machine, available at extremely low cost, that will enable you to save your larger machines for larger, heavier work. You'll find it meets your most exacting requirements for precision. Get our accuracy information and you'll see what an outstanding investment this machine represents.

Table movement: 6"x10"; table size, 7"x171/2".

Send TODAY for complete information.



LINLEY BROTHERS COMPANY

663 State St. Ext., Bridgeport 1, Conn.



DETROIT STAMPING COMPANY

Protective coating chemical for aluminum

A protective coating chemical, Alodine No. 1200, which is said to form an amorphous mixed metallic oxide coating of low dielectric resistance that provides high corrosion-resistance for unpainted aluminum, is any nuced by the American Chemical Paint Co., Dept. BB, Ambler, Pa.

Product is recommended for coating wrought products that are not to be painted or are to be only partially painted, and for coating casting and forging alloys whether or not these are to be painted.

Ribbon-type sealer

A versatile new fabric-reinforced black synthetic rubber sealer in ribbon form that can be used as an effective



weather-proof, water-tight seal is announced by the Adhesive and Coatings Div., Minnesota Mining and Mfg. Co.,

nounced by the Adnesive and Coatings Div., Minnesota Mining and Mfg. Co., 423 Piquette Ave., Detroit 2, Michigan. Designated as EC-1202, the sealer is easily applied by simply laying or pressing the ribbon on one surface before riveting, screwing or bolting the second surface to the first. Adhesion properties are such that the ribbon will stay in place on vertical or overhead surfaces during assembly operations. It can be stripped off and reapplied, if necessary.

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Capacity

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Dimensions 9"x3-9/16".
Only \$19.75 postpaid.

Practical in every sense of the word. One outstanding feature is the quiet, easy and accurate reading! Eye strain resulting from use of ordinary calipers is eliminated. Made of stainless steel and the highest workmanship. Measures inside, outside and depth up to 6". Graduations 1/100" and 1/128". Dial 1/4" dia. Millimeter marking up to 150 on lower face of frame. Order today. Only \$19.75 each postpaid.

CHARLES H. BROWN & CO.

EXCLUSIVE IMPORTERS AND DISTRIBUTORS NEW YORK 5, NEW YORK





Forming tool and tool holder

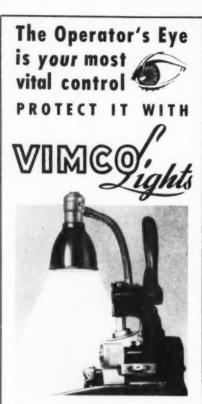
The Indian Motor Machine Shop, Dept. BB, 1896 S. Limestone St., Springfield, Ohio, announces the Thomas forming tool and tool holder that is said to incorporate many new principles and a more simplified method of lathe operation that saves lathe time.

The tool is machined from solid steel, hardened and ground. It can be fitted to a lathe quickly, where it becomes a part of the lathe with no other equipment needed except tool bits; forms shafts, between centers, or with a collet or chuck.

With regular ground tool bits furnished, one can turn outside, right or left, chamfer 45° right or left, cut ½" radius, bore the inside, face left or right side and cut off, working up to the jaws of a collet or chuck and past tail stock center.

When tool bits are placed in the forming tool they are always on dead center; the holder is rigid, eliminating chatter. When the boring and inside threading

September, 1953



No machine can be better than the eyes that guide it. Don't let them strain and fatigue under insufficient plant light. . . . shadows or glare.

You can make your machine completely **light independent** by installing Vimcolights. Vimcolights are the rugged, non-glare lights that have accompanied machine tools as original equipment since 1919.

Write for Bulletin 74.

See Better . . . Work Better

VIMCO MFG. CO., Inc.

Since 1919
III Brayton St. Buffalo (3, N.Y.

bar is added and tool bit set in, the cutting points for inside boring and threading are lined with lathe centers. This inside boring and threading bar fits through the center axis of the forming tool, tapered and drawn in tight with a cap screw.

Easy-reading calipers

Charles H. Brown & Co., Dept. BB, 81 Beaver St., New York 5, N.Y., are introducing calipers that are claimed to be an improvement over many types.

Outstanding feature is said to be the quick, easy and accurate reading of measurements on the dial, and the elimination of eye strain that results from too small or indistinct lettering.

The instrument is made of stainless steel; measurement inside, outside and



depth is up to six inches. Graduations 1/100'' and 1/128''. Dial is $1\frac{1}{4}''$ dia. One full turn of the indicator represents $\frac{1}{2}''$. Fifty markings in red on inner rim and 64 markings in black on outer rim of dial; millimeter markings up to 150 on lower face of frame. Total length is $9''x3\frac{3}{18}''$.

Safety saw

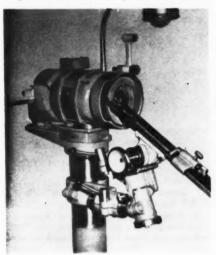
A new controlled cut, carbide tipped safety saw has been placed on the market by the W. F. Meyers Co., Inc., Dept. BB, Bedford, Ind.

The Meyco safety saw will not grab work, it is claimed, consequently will not kick back at the operator. It cuts down on the cause of most accidents, because it will not grab and pull in a hand that accidentally touches it.

Economy features consist of a lower first cost, because of fewer teeth; lower operating cost, because of longer life between regrinds; and smoother cuts which often make additional finishing operations unnecessary.

Model DA sterling drill grinder improved

Improvements on the Model DA Sterling drill and carbide grinder designed



for greater convenience have recently been announced by the McDonough Mfg. Co., Dept. BB, Eau Claire, Wis.

These include replacing two common hex nuts requiring wrenches with quick action levers, which still further speeds up the simple adjustment for changing drill sizes and eliminates the need of a wrench.



The simplified PYRO Optical is the ideal instrument for direct temperature readings of ANY heated object in your plant, Completely SELF-CONTAINED, PORTABLE, RUGGED, LIGHT WEIGHT (3½ ibs.) and FOOLPROOF. Ne cerrection charts, no accessories and no maintenance expenses. Unique design permits temperature determination even on MINUTE SPOTS, Fast MOV-ING OBJECTS and of the SMALLEST STREAMS. Write for Catalog No. 80

THE PYROMETER INSTRUMENT CO. New Plant and Laboratory, Bergenfield 3, N.



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- Save Compressed Air
- Save Compressor Wear

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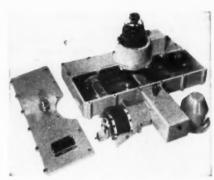
Automatic contour wheel dresser for cylindrical grinders

Model 42 Magni-Form automatic contour wheel dresser of the Hoglund Eng. & Mfg. Co., Dept. BB, 343 Snyder Ave., Berkeley Heights, N.J., permanently mounts to the right of the foot stock on inclined table type plain cylindrical grinder. This dresser has been adapted to Brown & Sharpe No. 5 plain grinder and also to Norton 6x30 plain grinder.

The dresser is available with different bases for any other cylindrical grinder.

It is claimed that almost any desired contour that can be entered by a diamond can be dressed into the grinding wheel with this diamond with accuracy of tenths. The diamond moves across the wheel in an uninterrupted movement, producing a perfect blend between the radii and tangents or any other complex form. An enlarged template controls the movements of the dresser and the diamonds.

Specifications: width of contourvariable, up to 2 in., depending upon ratio template desired; depth of con-



tour—variable, depending upon ratio template desired; maximum wheel diameter—no limit; template ratios—variable, up to 1:1 to 20:1; weight of dresser —80 lbs.

1" Lead screw for 5/16" to 5/8" tapping

A new larger type of lead screw which is said to increase range of lead screws and "auto-tap" lead screw tap-

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For Tools and Small Parts

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THE COOLEY BENCH MODEL for HARDENING AND TEMPERING



Max. Temp.	Sixes	Price
1850°	8" x 6" x 14" 10" x 6" x 18" 10" x 8" x 18"	\$220 to \$575
2000°	8" x 6" x 14" 10" x 6" x 18"	

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Controlling Pyrometers carried in stock — available for all applications.

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GUARANTEED NOT TO BREAK!

NEW AUTOSET



Self-setting hold-down clamps for presses and machine tools

No packing required—has 3 interrelated contact surfaces. Tools gripped, can't slip. Malleable castings. Washer attached preventing misplacement. All sizes in stock.

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Since 1943—manufacturers of aircraft clips and clamps conforming to latest AN specifications.

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Cut your reaming costs in half with the inserted blade — both adjustable and replaceable.



Rogers ADJUSTABLE BLADE REAMERS combine low initial cost with fractional replacement cost after inserted blades are worn to adjustment limit.

JOHN M. ROGERS TOOL COMPANY
SINCE 1885
GLOUCESTER CITY, N. J.



ping attachments from 5/16" to 5%" is announced by Automatic Methods, Inc., 965 W. Grand St., Div. 163, Elizabeth, New Jersey.

Screw is furnished in a variety of pitches including 27 and 18 pitch for 1/4" and 1/4" pipe taps. A Jacobs Rubber-flex collet takes tap shanks up to 5%". Special collets accommodating larger size taps are also available. Threads of the lead screws are precision ground; split nut is designed to provide for wear take-up.

Machine setup kit

A new machine setup kit in a wide range of sizes is announced by Jergens



Tool Specialty Co., Dept. BB, 712 East 163rd St., Cleveland 10, Ohio.

According to the manufacturer, this kit contains 24 studs; 4 extension nut couplers; 4 flange nuts; 4 "T" slot nuts and 4 strap clamps with stud diameters available in \%", \\\^2\', \%", \%" with 3 different tee slot nut sizes available for each stud diameter. The kit is packaged in a heavy gage steel kit holder with baked enamel finish and wooden inserts to hold studs in position. The kit is designed so that it can hang on wall or be set on table close to the machine. All parts are of heat treated alloy steel with black penetrate finish.



San Marino, California

Fork lift truck has no clutch

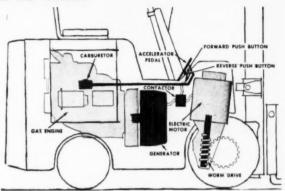
Development of a fork lift truck which is said to provide fuel economy. smoothness of acceler-ation, ease of maintenance, safety and operator convenience was announced recently by The Baker-Raulang Co., Truck Div., Dept. BB, 1230 W. 80th St., Cleveland 2. Ohio.

Called the "Gas-O-Matic," the new truck boasts a unique transmission system that needs no clutch nor gear

shift. A gasoline engine, variable voltage generator and an electric motor is

the power system.

The smoothness of acceleration and inching control afforded by the new Baker truck is said to compare with of the modern, automatictransmission passenger car. Travel speed is controlled entirely by foot



pressure on the accelerator.

Specifications of the Gas-O-Matic, which is now available in a 4000lb. capacity model, are: over-all length 123"; over-all width 39"; turning radius 78"; standard lift 83/130; minimum intersecting aisle 69"; over-all heights 83"; maximum travel speed 8 m.p.h.; weight 7,500 lbs.



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Approx. Shipping Scraped Ground Weight Finish Finish 12x12 40 \$22.50 \$42.50 12x18 60 27.50 62.50 18×24 100 79.50 112.50 F. O. B - N. Y. C.

Made of High Quality SEMI-STEEL. -

Precision Ground or Scraped to close tolerance for layout and assembly work.

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All Purpose Tool Room and Machine Shop Vises.

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Adjustable Pressure Production Vise.

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Give you more value for your money!

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 The MILWAUKEE PROFILE GRINDER for high speed, precision grinding of curved and irregular contours.

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CONTINUOUS HINGES

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

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STRAIGHT OR INVERTED-TAPER SHANKS SINGLE OR DOUBLE FLUTE . SINGLE OR DOUBLE IND UP-CUT OR DOWN-CUT SPIRAL AVAILABLE IN ANY SIZE, TYPE, OR QUANTITY

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MANUFACTURERS OF AIRCRAFT PRODUCTION MACHINERY

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 AUTOMATIC TORQUE CON-TROL . . One Minute to Adjust . . Prevents Ten One Minute to Prevents Tap Operator Need Breakage . Not Be Skilled

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—capacity No. 256 to ¾" in Steel
½" in Aluminum.
No. 2B POSITIVE
TAPPER—capacity
¾" to ¾" in Steel
No. 3A POSITIVE TAPPER—
capacity ½" to 1½" in Steel
No. 4A TAPPER—Capacity
10 ¾" to 51 Steel
Taps.
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PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies

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STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL PURBLICENTER DRILLIHEAD

Standardize on COLLET

SPEED,
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Automatic adjustment speeds up production in multiple operations with push-out type HALL COLLET CHUCKS. Full spindle capacity or over.

Tremendous grip over or under stock size to .007-without adjustments. All grip ...no slip. No bearings...no heat or lost power. Instant release without stopping lathe.

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Made in Two Sizes to Fit Your Requirements:

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Round, square or hexagon collets, plain or serrated
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Adjustable Automatic Stock



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GRADUATED SWIVEL VISE FOR SHAPERS

Specifications:

Depth of Jaws21/2"	
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Base Size	
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unless otherwise specified by customer)	
Shipping Weight270 lbs.	
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Holes for Tee Slot Bolts— Your Specifications

FRANK P. TISE MACHINERY CO.
1246 SWIFT AVENUE NORTH KANSAS CITY, MO.

Horizontal gear shaver

A horizontal gear shaving machine of a new type being distributed by Morey Machinery Co., Inc., Dept. BB, 410 Broome St., New York 13, N. Y., has recently been completed by David



Brown Machine Tools Ltd. of Manchester, England. The machine was designed for shaving gear tooth profiles of large turbine pinions, where close tolerances and high quality finish are required. The machine is known as David Brown-Muir S24H. It will shave pinions of 4" to 24" diameter and up to 100" long.

The S24H, which weighs 20 tons, is designed for shaving by the radial loading method, whereby both flanks of the gear tooth are cut simultaneously. If required, an oil-cooled brake can be fitted to the cutter spindle to allow single-side or selective shaving. Guideways in the main bed—a one-piece casting—provide means for locating the driving head and tailstock, and for the saddle carrying the shaving cutter head.

Size Control gear wire formula

The Size Control Co., Dept. BB, 2500 W. Washington Blvd., Chicago, is presenting a new type gear wire mathematical formula to industry for the first time. By using this one formula it is said to be possible to figure the correct wire sizes for both spur and helical gears whereas in the past it has been necessary to use two different mathematical formulas.



MILWAUKEE SURFACE PLATES

Over forty years of experience gives you "proved" performance — added assurance a quality production. Milwaukee Surface Plate Angles, Parallels and Straight edges are all made of the highest quality semi-steel and finished to exact dimensions.

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MLR panel saw pull rod new design feature

Hendrick Mfg. Corp., Dept. BB, 11 Selman St., Marblehead, Mass., has added a pull rod to its MLR (Mitermaster long rail) panel saw rails as a new design feature of this large-stock radial-arm power tool. Added as standard equipment, the long pull rod



makes it possible for an operator to draw the carriage of the MLR panel saw across the stock without changing position. Prior to this addition, manufacturer had recommended a sprocket or pulley chain system of the user's own device in the saw's operation.

By means of the rod, the carriage of the saw is drawn through the stock for a distance of two feet. At that point a quarter turn of the handle disengages rod from carriage and the rod is returned for another two foot stroke. Stops on the rod limiting it to the twofoot stroke may be removed to effect an uninterrupted pass if desired. Provision has also been made for a lead screw which may be used with the equipment when a slow positive feed is required (such as heavy gage sheet steel and ceramics). The MLR is offered in three models with or without motor: with 6' rails and a capacity of 41/2'; with 8' rails and a capacity of 61/2'; and with 10' rails and a capacity of 81/2'.

Saw blade display

The Capewell Mfg. Co., Dept. BB, 60 Governor St., Hartford, Conn., is offering hardware retailers an attractive new metal counter stand for displaying their line of Technite hand hack saw blades. The unit holds a supply of 100 blades.

Almost 68,000 light trucks owned and operated by laundries and linen services have been offered to civil defense for emergency ambulance service. Some of these trucks already have been adap-

ted to ambulance use through the addition of emergency fittings to hold stretchers, and have undergone trial runs in test exercises throughout the country.

Get a better "SURFACE GRINDER" job at less cost ORDER DIRECT on our 10 day money back guarantee.

RADIUS DRESSER \$39.00



Hardened shatt—Bearing adjustable for wear. Diamond always perfectly centered. Easily set adjustable 180° stops.

10" Wheel size for DoALL and NORTON Grinders — \$44.00, Diamond \$7.00.

SPECIAL 14" Wheel Size \$95.00.

ANGLE DRESSER \$44.00



Ball Thrust Bearings, 24

Precision Ground Surfaces. Can be set very accurately with a Protractor. Works underneath the wheel. Large bearing surfaces.

"MIGHTY MIDGET"

SPERMAN METAL SPECIALTIES . 2199 EAST 21st ST. BROOKLYN 29, N. Y. MAKE SET-UPS FASTER

Conserve valuable production time by using the fully universal, easily-operated MASTER MULTI-SWIYEL VISE for intricate, angular set-ups in your shop. 3 swivels instantly set any compound angle. Used in shops throughout the world. Interchangeable platen optional. Write for circular.

DONOVAN MFG. CO.
80 BATTERYMARCH ST. BOSTON, MASS.



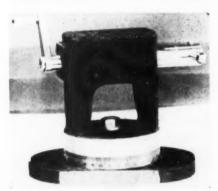
Phelco angle dresser

The Phelco angle dresser is a precision built instrument for dressing emery wheels that has several new and unique features. It is made by Phelan Eng. Service, Dept. BB, 1913 W. Magnolia, Burbank, Calif. First is the ability to dress both sides of a wheel without disturbing the original setup. This is accomplished by means of a double-

end diamond. This fixture can be used on both cylindrical and surface grinders by means of a slight adjustment. It reduces setup time and can be used by inexperienced operators.

Compact, this angle dresser has a diamond travel of $2^{1/4}$ ", with accuracy assured by means of a threaded shaft operated by a small hand crank.

The base of the dresser is machine engraved to 360°, in graduations of 1° increments.



Direct reading chamfer micrometer gage

A chamfer micrometer gage recently introduced by Acme Industrial Co., Dept. BB, 200 N. Laflin St., Chicago 7, Ill., is designed to directly read end diameters of chamfers up to 1" from 0° chamfer to 90° included angle maximum chamfer. Depth of chamfer in a hole can also be computed. Gage is read like any standard micrometer.

A master check bar with known indicated end diameter and chamfer is furnished with each gage for checking calibrations of micrometer.

REDUCE DRILL BREAKAGE

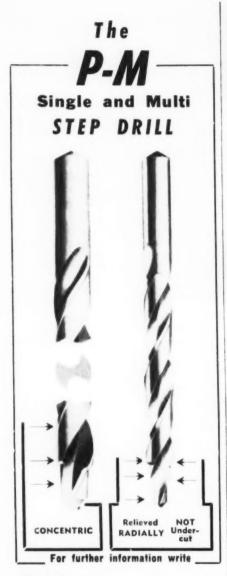
... with full length bearing precision bushings, O.D. ground true to I.D. • We specialize in hole sizes #80 to ½", in any body size.

Other sizes to your specifications.

Production small hole drilling, our specialty.

Write for catalog and quotations.











Especially designed to meet demand for medium price and accuracy plus versatility and capacity for all grinding jobs in any shop. Accessories for external, internal and surface grinding—wet or dry—as well as tool and cutter grinding, included as standard equipment.

Write today for full information.

McDONOUGH MANUFACTURING CO. 1502 GALLOWAY EAU CLAIRE, WISC.

GENEVA DRIVES NOW OFFERED AS STOCK ITEM

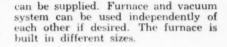
If you use Stock Gears, Bearings, Bushings, Pulleys, Etc., You Need Our Circular On GENEVA DRIVES.

WE ARE NOW ASSIGNING EXCLUSIVE TERRITORIES TO REGISTERED SALES ENGINEERS ONLY—WRITE TODAY.

GENEVA MACHINE & TOOL CORP. 402 ELLAMAE ST., TAMPA 2, FLORIDA

High temperature vacuum furnace

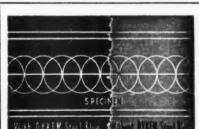
The K. H. Huppert Co., Dept. BB, 6830 Cottage Grove Ave., Chicago 37, Ill., has designed a new type high temperature electric vacuum furnace, the Airfre, for production and laboratory use where temperatures up to 2500°F. and vacuums up to 29" are required; higher vacuum for special application





Quick setup (less than two minutes) without a foreman is claimed to make the new Stewart Warner industrial balancer ideal for balancing milling heads, cutters, armatures, etc. It is made by Merrill Eng. Laboratories, Dept. BB, 1240 Lincoln St., Denver, Colo. Precision sensitivity is possible at all weights of items balanced from ½ lb. to 1000 lbs. By turning a knob, five dash pot positions allow balancing at different sensitivity from complete damping to 0.04 oz. in. Setup to various lengths is done by simple walking mechanism operated by handle on movable stanchion. Length range is 4½" to 55" between bearing surfaces. Diametral capacity is from ½" to 44". This balancer is also used for maintenance, job type work or for production.





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Stops Losses in Making Dies and Templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

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NO MORE COSTLY JIGS

on small production jobs with

Troyke Worm Wheel Operated Tables Size:



9 - 12 - 15 - 18 - 21 - 25 See your dealer or write for Catalog No. 17.

Fully illustrated showing all models and applications to various

TROYKE MFG. CO., Cincinneti 9, Ohio, U.S.A.



Drilling attachments can not be furnished for Worm Whee Operated Tables.

SAVE OVER 50%

by having your

BAND FILES SHARPENED

All Types & Shapes

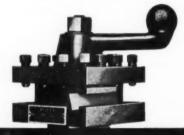
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285 Fifth St. Oakland 7, Calif.



'America's first and finest CROZIER TOOL POST TURRET

12 position indexing now makes possible the alignment with work at any thirty degree increment - built-in cut-off tool and holder and positive rapid indexing. They are available in 3 sizes. much as 75% set-up and down time. Write for catalog.

CROZIER MACHINE TOOL CO.

Hawthorne, California



for speedy drilling OF COTTER PIN HOLES IN SCREWS, BOLTS, ETC. The KENT Duplex DRILLER

Two drills move toward the center. One drill then withdraws and the other completes the hole. Parts can be drilled and countersunk at the same operation. Semi-automatic or full automatic feed. Write for illustrated descriptive literature.

The KENT MACHINE CO., Cuyahoga Falls, O.

Drillers - Threaders - Slotters - Countersinkers - Bar Pointers

Announce changes in Nebel lathes

The Nebel Machine Tool Co., Dept. BB, Cincinnati, Ohio, has announced the modification of its 'LN' series engine and removable block gap lathes. The modified 'LN' series is a rated 16" swing size and offers these changes:

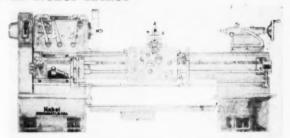
1.(a) Quick change gear box (instead of the semi-quick in the

old series). Standard box offers 30 feed and 28 thread changes.

(b) Quick change gear box with 20/40 compounding gears offers 48 feed and 46 thread changes.

2. Heavier apron and carriage.

 Arranged for 5- to 7½ h.p. main drive motor, single or 2-speed. With 2-speed 900/1800 r.p.m. motor, maximum spindle speed of 750 r.p.m. is attained.



All plastic spectacle-type safety goggle

The Pennsylvania Optical Co., Dept. BB, 234 S. 8th St., Reading, Pa., announces the addition of Model 707, a new plastic frame spectacle-type safety goggle. Its acetate frame has been designed to retain the safety lens even when subjected to severe impact. The non-sparking 707 is especially suitable for use in chemical and electrical plants.

767 STANDARD SIZES OF MARSHALL STEEL PRECISION GROUND FLAT STOCK

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Cartridge case marking machine

A new roll marking machine for rolling permanent identification data into the top flat surface of large cartridge cases has just been developed by the Nobel & Westbrook Mfg. Co., Dept. BB, 20 Westbrook St., East Hartford 8



Conn. This new machine will accommodate cartridge cases, up to the 105 mm. shell size, of either brass or steel.

This machine performs a marking operation which formerly has required hydraulic presses of as large as 50-ton capacity. This marking machine weighs slightly less than 1000 lbs. and only occupies a floor space of 28"x30".

Cold chisels and steel punches being made by Billings & Spencer

Cold chisels and six styles of steel punch are new products announced by The Billings & Spencer Co., Dept. BB, Laurel St., Hartford, Conn. Their cold chisels are forged from tool steel, hardened and tempered. Standard size chisels with cutting edges ranging from ¼" to 1" have an octagon shank for non-slip grip and are given a polished finish. Extra long cold chisels are available with cutting edges in the %" to 1" range in lengths of 12", 15" and 18".

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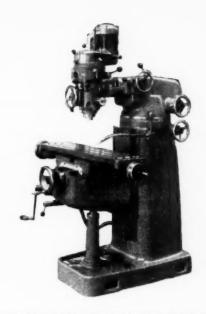


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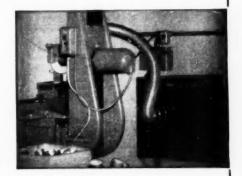
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Centers, Dead, 96

Centers, Lathe, 353

A

Abrasive Belt Machines, 12, 387
Abrasive Cloth, Paper, Disc, Belts, Wheels, Stones, etc. 62, 63, 74, 80, 81, 204, 234, 242, 298
Accumulators, 418
Actuators, 418
Air Control Equipment, 79, 209
Air Operated Equipment, 235, 323, 373
Air Tools, 79
Angle Blocks, 363
Angle Plates, 363, 407

В

Arbor Spacers, Shim Stock, 395, 401

Angles, 407

Backrests, Roller, 99 Balancing Machines, 183, 217, 308 Bar Pointer, 412 Bar Racks, 344 Base Units, Magnetic, 316 Bending Equipment, 116, 128, 142, 290, 367, 371, 376 Blow Guns, 79 Boring Bars and Tools, 129, 241, 260-B Boring Chucks, 343 Boring, Drilling & Milling Machines, 127, 202, 344 Boring, Facing Machines, 1, 11, 66, 67, 86 Boring, Facing Tools, 126 Boring Heads, 75, 129, 372 Boring Machines, 11, 20, 66, 67, 127 Boring Tools, 13, 383 Bracket, Spindles, 322 Broaches, 38, 39, 312 Broaching Machines, 10, 38, 39, 108 Brushing Machines, 69 Buffing Machines, 436 Bushings, 374, 390, 391, 409 Bushings, Drill Jig. 338 Bushings, Rotary, 304

Centers, Live, 340, 355, 365, 385, 395, 402 Centers, Motorized, 233 Chip Breakers, 12 Chip Breakers, Drill, 392 Chucking Machines, 72, 73 Chucks, 110, 359, 381 Chucks, Collet, 26, 110, 221, 406 Chucks, Drill, 93 Chucks, Index, 373 Chucks, Lathe, 82 Chucks, Magnetic, 82, 200, 269 Chucks, Quick Change, 221, 241 Chucks, Safety, 54 Clamps, 282, 311, 401 Clamps, Jaw. 42 Clamps, Toggle, 311, 318 Clutches, 427 Coatings, Plastic, 325 Coil Cradles, 307 Collets, 77, 110, 355 Combination Tools, 353 Comparators, Dial, 223 Coolant Separators, 212 Coolant Systems, 403 Coolants, 285 Copers, 128 Counterbores, 34 Countersinks, 34, 35, 353, 405, 412 Cut-off blades, 353 Cut-off machines, 20, 166 Cut-off tools, 45 Cut-off wheels, 166, 204 Cutters, 162, 163, 260-B, 287, 353, 376 Cutting Fluid and Oils, 22 Cutting Machines, 166 Cutting Tools, 18, 19, 28, 45, 65, 83, 221, 375, 416 Cylinders, Hydraulic and Pneumatic, 104, 105, 209, 243 418

Calipers, 396, 416, 418
Cams, 361, 416
Carbide Stock, 171, 416
Carbide Tools, 12, 13, 28, 34, 44, 45, 53, 122, 296, 200, 337, 383, 401, 416

D

Deburring Machines and Tools, 299, 294, 310 Demagnetizers, 82, 387 Dial Indicators, 223, 306 Diamond Lapping 041, 343 Diamond Powder, 417 Diamond Tools, 379

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Die Making Machines, 20, 32, 127

Die Filers, 380, 404

Die Flippers, 233

Die Heads, 221

End Finisher, 290 End Mills, 58, 71, 146, 814, 858 Engravers, 21, 393, 405, 415

Face Mills, 32, 221, 287 Facing Heads, 376 Facing Tools, 44 Feeds, Roll. 118 Feeders, Work, 29, 297 Files, 74, 119 Filing Machines, 32, 294, 406 Filters, 47 Flat Stock, Ground, 413 Flexible Shaft Equipment, 94, 95, 100, 101, 187 Plexible Shaft Machines, 13, 94, 95 Floats, 339 Flux, 321 Form Turning Machines, 126 Forming Pacifities, 21 Forming Machines, 20 Furnaces, Heat Treating, 248, 317, 319, 388, 400

G

Gage Blocks, 211, 300, 351 Gages, 79, 115, 173, 223, 252, 352 Gages, Air, 252 Gages, Dial, 55 Gages, Groove, 160, 320

Gages, Height, 418, 417 Gages, Internal, 189 Gages- O-Ring, 160 Gaget, Plug. 309, 326 Gages, Snap. 2 Gages, Surface, 299 Gages, Thread, 189, 260-A, 300, 391 Gear Cutting Machines, 369 Gear Measuring Equipment, 300 Gear Shift Drives, 109 Gears, 216 Greace Fittings, 323 Grinders, 8, 9, 12, 32, 315, 425 Grinders, Air, Portable, 356 Grinders, Bench, 227, 435, 438 Grinders, Carbide Tool, 12, 425 Grinders, Centerless, 14, 15 Grinders, Chaser, Cut-off Wheel, 364 Grinders, Chucking, 60, 61 Grinders, Cutter, 378 Grinders, Cylindrical, 51, 62, 63, 202 Grinders, Diamond Finishing, 12 Grinders, Drill, 32, 127, 184 Grinders, Face, 68 Grinders, Face Mill, 32 Grinders, Floor, 227 Grinders, Hob, 162, 163 Grinders, Hydraulic, 8, 9 Grinders, Knife, 68 Grinders, Pedestal, 436 Grinders, Precision, 245 Grinders, Profile, 117, 404 Grinders, Radial Relief, 6, 245 Grinders, Saw. 360 Grinders, Surface, 62, 63, 68, 184, 210, 263, 271 Grinders, Tap, 245 Grinders, Template Tool, 32 Grinders, Tool & Cutter, 21, 32, 62, 63, 68, 127, 177, 184, 213, 225, 274, 305, 410, 435 Grinders, Tool Post, 191 Grinders, Tool Room, 51 Grinders, Wheel, 12 Grinding, Boring, Milling & Drilling Attachment. Grinding Wheels, 62, 65, 107, 242, 255, 298 Gritcloth, 80, 81 Guides, Drills, 115

Hammers, Hand. 207 Hammers, Impact, 325 Hammers, Plastic, 382 Hammers, Rawhide, 172 Hardness Testing Equipment, 27, 414 Hinges, 404 Hobbing Machines, 162, 163. Hobs, 162, 163 Hoists, 323 Holders, Back Rest. 99 Holders, Cutoff Blade 99 Holders, Cylinder Wheel. 107 Holders Die, 84 Holders, Drill, Tap & Reamer, Shit. Holders, Floating Drill, 99 Holders, Magnetic, 418 Holders, Tool, 89, 99, 111, 353 Holders, Turret Backrest, 107 Hole Location Accessories, 223 Honing Machines, 7, 344 Hose Assemblies, 47, 418 Hydraulic Equipment, 209



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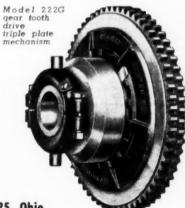
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Index Fixtures and Tools, 141, 307, 386, 391, 395, 412 Indicators, Precision, 359

.

Jig Borers, 43, 233, 395, 417 Jig Feet, Double End and Screw Type, 414 Jig Feet, Screw and Press Type, 414 Jig Grinders, 228, 233 Jigs and Fixtures, 244 Jointers, 75

K

Keyseaters, 344, 353, 399, 414, 417 Keyway Cutting Equipment, 312 Knobs, Machine, 414 Knurling Tools, 99

L

Lapping Machines, 8, 9, 384, 431
Lathe Attachments, 83, 259, 316, 347
Lathes, 127, 134, 135, 169, 190, 278
Lathes, Automatic, 112, 113, 183, 217, 414
Lathes, Bed, 316, 347
Lathes, Bench, 26, 225
Lathes, Contouring, 134, 135
Lathes, Engine & Toolroom, 58, 59, 66, 67, 112, 113, 177, 192, 315, 328, 414
Lathes, Fibor, 225
Lathes, Gap, 58, 59
Lathes, Gewelers', 284
Lathes, Failatock, 316, 347
Lathes, Tailatock, 316, 347
Lathes, Turret, 177, 183, 292, 217, 225, 315
Layout Fluid, 103
Lead Screw Tappers, 295
Light Wave Equipment, 309
Lighting Equipment, 392, 316, 398
Locks, Fixture, 283
Lubricants, 125, 197, 285
Lubricants, 47, 323

M

Magnifiers, 3, 56, 389, 414, 417 Marking Equipment, 52, 218, 289, 387 Marking Machines, 52, 349, 393 Measuring, Checking Equipment, 252, 367 Measuring Wires, 300 Metal Spraying, 267 Micrometers, 223, 397 Micrometers, Lightwave, 300 Micrometers, Pedestal, 352 Mill Heads, 124 Milling Cutters, 18, 19, 44, 53, 65, 102, 241. 260-B, 296, 324, 353, 363, 380 Milling Cutters End. 44 Milling Cutters, Side, 44 Milling Heads, 126 Milling Machine Attachments, 76, 259, 376 Milling Machines, 1, 11, 21, 46, 127, 271, 315, 376, 417 Milling Machines, Hand, 78 Milling Machines, Horizontal, 177, 193 Milling Machines, Planer Type, 11 Milling Machines, Ram Type, 417

Milling Machines, Rotary Head, 120, 121
Milling Machines, Turret, 76, 417
Milling Machines, Vertical, 1, 177, 193, 246, 417
Milling Planers, 11
Mills, End, 65
Mills, Hollow, 353
Motors, Electric, 109
Motors, Gear Head, 418
Mounted Wheels, 327
Mounting Pads, 138
Multi-Operation Machines, 294
Multi-Operation Tools, 241

N

Nibbling Machines, 293 Notching Equipment, 161, 247 Nuts, Coupling, 414 Nuts, Flanged, 414

Oil Groovers, 351

P

Parallels, Box, 363, 407 Parallels, Flat, 407 Partitions, Wire Mesh, 434 Pinion Cutting Machines, 369 Pin Oilers, 106 Planers, 11, 75, 127 Planers, Milling Type, 11 Plates, Surface, 407 Plating Equipment, 348 Pneumatic, Hydraulic Equipment, 209 Poppet Valves, 136 Portable Air Tools, 57, 235, 358 Portable Electric Tools, 40, 97, 235, 436 Precision Tools, 306 Press Brakes, 362, Back Cover Press Feeds, 307 Presses, Air. 41, 243 Presses, Arbor, 41 Presses, Bending, 142 Presses, Blanking, 142 Presses, Braking, 142 Presses, Corrugating, 142 Presses, Deep Throat, 280 Presses, Flywheel Type, 288 Presses, Foot, 41, 307 Presses, Forcing, 50 Presses, Forming, 142 Presses, Horn, 280 Presses, Hydraulic, 50, 243, 396, 415, Back Cover Presses, Mechanical, Back Cover Presses, O.B.I., 280 Presses, Power, 250, 321, 366 Presses, Punch, 142, 250, 260-A, 321, 345, 346 Protractors, 416 Pullers, Die Set, 106 Pumps, Coolant & Lubricant, 243, 292 Pumps, Hand, 418 Pumps, Hydraulic, 418 Punch Press Sets, 414 Punch, Shear, Notchers, 350 Punches, 92, 128, 293, 352, 401 Punches and Dies, 249, 321 Punches, Power, 350 Pyrometers, 399, 400

Quick Change Tools, 130

Rules, Steel, 306

Step Tools, 410

Stock Oiler, 307

Racks, 344 Reamers, 18, 19, 36, 45, 53, 64, 71, 162, 163, 241, 314, 337, 369, 401 Recessing Tools, 99 Rectifiers, 82 Reels, Stock, 118, 307 Regulators, 47 Retaining Rings, 31 Rivet Setters, 209 Riveting Machines, 350 Rod Parter, 293 Roll Feeds, 286, 307 Roll Markers, 352 Roller Skids, 336 Routers, 405 Rubber Products, 204

Safety Devices, 369, 410 Sanders, Belt. 75 Sanders, Spindle, 75 Saw Blades, Band, 30, 206, 216, 354 Saw Blades, Hack, Inside front cover, 39, 206, 216 Sawing Machines, 75, 127, 166, 406 Sawing Machines, Band, 41, 75, 208, 433 Sawing Machines, Die, 380 Sawing Machines, Friction, 128 Sawing Machines, Hack, 82 Sawing Machines, Jig. 75 Saws, Circular, 353 Saws. Metal Cutting, 353 Scrap Cutters, 307 Scrapers, Hand, 341 Screw Drivers, Power, 40, 144, 358 Screw Machines, Automatic, 90, 236, 237 Screw Machines, Hand. 236, 237 Screw Slotters, 353, 395 Screws, Cap. Set. Socket & Machine, 365, 369, 380, 414, Inside back cover Services, Milling, Grinding, Lapping, Rebuilding, Repairing, Business, etc., 379, 406, 412, 414, 116, 431 Shapers, 34, 35, 75, 169, 177, 225, 315 Shearing Machines, 24, 25, 34, 35, 128, 350 Shears, Double Angle, 128 Shears, Throatless, 368 Shields, 410 Shim Stock, 395, 401 Slitting Cutters, 41 Slotters, 45, 127, 412 Solenoids, 72, 73 Spacers, 141, 417 Special Machinery, 86, 96, 127, 183, 217, 344, 377 Special Tools, 34, 53, 65, 102, 309, 353, 375, 379, 406 Spindles, 88, 91, 274 Spring Collers, 195, 414 Square Hole Drills, 416 Stamps, Steel, 114, 385, 393 Steel and Steel Stock, 48, 49, 159, 413 Step Blocks, 414

Stock Straighteners, 307 Stops, Feed, 406 Stops, Revolving, 99 Straight Edges, 407 Stud Setters, 221 Studs, 414 Superfinishers, 183, 217 Surface Plates, 62, 63, 85, 242, 363, 404, 407, 416

Tables, Rotary & Index, 395 Tap and Drilling Units, Reverse, 405 Tap Guide Fixtures, 115 Tap Heads, 405 Tap Sharpeners, 245 Tapes, 306 Tappers, 115, 405 Tapping Attachments, 13, 405 Tapping Heads, 54 Tapping Machines, 273, 295, 344, 394 Taps. 13, 16, 17, 18, 19, 71, 181, 221, 309 Thread Rolling Machines, 72, 73 Threaders, Hand, 115 Threading Machines, 273, 290, 352, 412, 423 Threading Tools, 72, 73 T-Nut and Stud Sets, 414 Tool Bits, 53 Tool Cribs, 434 Tool Heads, 357 Tool, Holders, 4 Tool Posts, 99, 241, 416 Tote Pans, 416 Tracing Tools, 44 Transfer Processing Machines, 96 Traps, Steam and Air, 339 Triangles, Thread, 300 Tube & Pipe Bending Machines, 290 Tube Deburring Machines, 296 Tube Fabricating 290 Tube Fittings, Collet Grip. 243 Turning Tools, 99 Turret Attachments, 259 Turrets, Drill, 279 Turrets, Lathe, 316, 341, 347 Turrets, Tailstock, 347 Turrets, Tool Post. 316, 347, 412 Type Holders, 114

Valves, 47, 79, 79, 136, 209, 243, 338, 387, 399, 418 Vises Air-Powered 116 Vises, Bench and Machine, 29, 76, 82, 195, 293, 311, 313, 340, 376, 380, 395, 404, 409, 417

Wheel Dressers, 62, 63, 233, 342, 343 Wire Straightening Machines, 307 Wires, Measuring, 391 Wrenches, Torque, 344

Index to Advertisers

	C
Acme Donneman Comportation	C
Acme Broach Corporation 10 Acme-Danneman Company, Incorporated 414 Acme Industrial Company 390 Acme Tool Company 363 Acme Wire and Iron Works 434 Accompany 363	C
Acme Tool Company 363	C
Acme Wire and Iron Works 434	
Acromark Company 349	C
Acro Metal Stamping Company 106	C
Adamas Carbide Corporation 171	C
Affiliated Machine & Tool Company 369	
Aget-Detroit Company	C
Acme Wire and Iron Works 434 Acromark Company 349 Acro Metal Stamping Company 106 Adamas Carbide Corporation 171 Affiliated Machine & Tool Company 369 Aget-Detroit Company 361419 Air Conversion Research Corporation 403 Air-Way Pump and Equipment Company 399 Alco Tool Company 84	C
Air-Way Pump and Equipment Company 399	C
Alco Tool Company 84	0000
Alco Tool Company 84 Alian Corporation 359 Allen Manufacturing Company Inside Back Cover American Broach & Machine Company 108 American Chain & Cable Company	C
Allen Manufacturing Company	-
Inside Back Cover	C
American Broach & Machine Company 108	0
American Chain & Cable Company	CCC
(Wilson Mechanical Inst. Division) 27	Č
American Coldset Corporation 370 American File Service 412	C
American File Service 412 American Gage & Machine Company 260-A	č
	000000
(Wahlstrom Float-Lock Sales Dept.) 313	C
American Pipe Bending Machine Company 371	C
American Standard Company 299	C
Ames Company, B. C	C
(Wahlstrom Float-Lock Sales Dept.) 313 American Pipe Bending Machine Company 371 American Standard Company 299 Ames Company, B. C. 223 Anderson Bros. Mfg. Co. 341 Armstrong-Blum Manufacturing	C
	0
	C
Armstrong Brothers Tool Company 4	C
Aro Equipment Corporation	-
Arrow 1001 & Redmer Company 314	C
Armstrong Brothers Tool Company 4 Are Equipment Corporation 323 Arrow Tool & Reamer Company 314 Atlantic Gear Works 216 Attax Company 122 Auto Moulding and Manufacturing Co. 404	-
Auto Moulding and Manufacturing Co. 404	č
And the second of the second o	Č
Baldor Electric Company 425	C
Baldor Electric Company 425 Barber Colman Company 162-163	0
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271	000
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartel Fagineering Company 352	
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartel Fagineering Company 352	
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartel Fagineering Company 352	
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80-81 Bay Manufacturing Co. 308	L
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80-81 Bay Manufacturing Co. 308	I
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80-81 Bay Manufacturing Co. 308	I
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80-81 Bay Manufacturing Co. 308	I
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80-81 Bay Manufacturing Co. 308	I I I
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80-81 Bay Manufacturing Co. 308	
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80-81 Bay Manufacturing Co. 308	I I I
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80-81 Bay Manufacturing Co. 308	
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80-81 Bay Manufacturing Co. 308	
Baldor Electric Company 425 Barber Colman Company 162 163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16 17 Bausch & Lomb Optical Company 58 Bay State Abrasive Products Company 80-81 Bear Manufacturing Co. 308 Behr-Manning Corporation 77 Benco Collet Manufacturing Company 77 Besly-Welles Corporation 71 Beverly Shear Manufacturing Company 368 Billings & Spencer Company 207 Black & Webster, Incorporated 325 Black Drill Company 303 Blake Company Edward 245 Blanchard Machine Company 107	
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 80-81 Bear Manufacturing Co. 308 Behr-Manning Corporaticn 74 Benco Collet Manufacturing Company 77 Besly-Welles Corporation 71 Beverly Shear Manufacturing Company 368 Billings & Spencer Company 207 Black & Webster, Incorporated 325 Black Drill Company 303 Blake Company, Edward 245 Blanchard Machine Company 107 Blaner Spring Winder Co.	
Baldor Electric Company 425 Barber Colman Company 162.163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16.17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80.81 Bear Manufacturing Co. 308 Behr-Manning Corporation 77 Benco Collet Manufacturing Company 77 Besly-Welles Corporation 71 Beverly Shear Manufacturing Company 368 Billings & Spencer Company 207 Black & Webster, Incorporated 325 Black Drill Company 303 Blake Company, Edward 245 Blanchard Machine Company 101 Blaner Spring Winder Co.	
Baldor Electric Company 425 Barber Colman Company 162.163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16.17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80.81 Bear Manufacturing Co. 308 Behr-Manning Corporation 77 Benco Collet Manufacturing Company 77 Besly-Welles Corporation 71 Beverly Shear Manufacturing Company 368 Billings & Spencer Company 207 Black & Webster, Incorporated 325 Black Drill Company 303 Blake Company, Edward 245 Blanchard Machine Company 101 Blaner Spring Winder Co.	
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80-81 Bear Manufacturing Co. 308 Behr-Manning Corporation 74 Benco Collet Manufacturing Company 77 Besly-Welles Corporation 71 Beverly Shear Manufacturing Company 368 Billings & Spencer Company 207 Black & Webster, Incorporated 325 Black Drill Company 303 Blake Company, Edward 245 Blanchard Machine Company 107 Blaner Spring Winder Co. (Div., Independent Machine Company) 414 Bloomfield Tool Corporation 414-416 Blue M Electric Company 317	
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80-81 Bear Manufacturing Co. 308 Behr-Manning Corporation 74 Benco Collet Manufacturing Company 77 Besly-Welles Corporation 71 Beverly Shear Manufacturing Company 368 Billings & Spencer Company 207 Black & Webster, Incorporated 325 Black Drill Company 303 Blake Company, Edward 245 Blanchard Machine Company 107 Blaner Spring Winder Co. (Div., Independent Machine Company) 414 Bloomfield Tool Corporation 414-416 Blue M Electric Company 317	
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80-81 Bear Manufacturing Co. 308 Behr-Manning Corporation 74 Benco Collet Manufacturing Company 77 Besly-Welles Corporation 71 Beverly Shear Manufacturing Company 368 Billings & Spencer Company 207 Black & Webster, Incorporated 325 Black Drill Company 303 Blake Company, Edward 245 Blanchard Machine Company 107 Blaner Spring Winder Co. (Div., Independent Machine Company) 414 Bloomfield Tool Corporation 414-416 Blue M Electric Company 317	
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80-81 Bear Manufacturing Co. 308 Behr-Manning Corporation 74 Benco Collet Manufacturing Company 77 Besly-Welles Corporation 71 Beverly Shear Manufacturing Company 368 Billings & Spencer Company 207 Black & Webster, Incorporated 325 Black Drill Company 303 Blake Company, Edward 245 Blanchard Machine Company 107 Blaner Spring Winder Co. (Div., Independent Machine Company) 414 Bloomfield Tool Corporation 414-416 Blue M Electric Company 317	
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80-81 Bear Manufacturing Co. 308 Behr-Manning Corporation 74 Benco Collet Manufacturing Company 77 Besly-Welles Corporation 71 Beverly Shear Manufacturing Company 368 Billings & Spencer Company 207 Black & Webster, Incorporated 325 Black Drill Company 303 Blake Company, Edward 245 Blanchard Machine Company 107 Blaner Spring Winder Co. (Div., Independent Machine Company) 414 Bloomfield Tool Corporation 414-416 Blue M Electric Company 317	
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80-81 Bear Manufacturing Co. 308 Behr-Manning Corporation 74 Benco Collet Manufacturing Company 77 Besly-Welles Corporation 71 Beverly Shear Manufacturing Company 368 Billings & Spencer Company 207 Black & Webster, Incorporated 325 Black Drill Company 303 Blake Company, Edward 245 Blanchard Machine Company 107 Blaner Spring Winder Co. (Div., Independent Machine Company) 414 Bloomfield Tool Corporation 414-416 Blue M Electric Company 317	
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80-81 Bear Manufacturing Co. 308 Behr-Manning Corporation 74 Benco Collet Manufacturing Company 77 Besly-Welles Corporation 71 Beverly Shear Manufacturing Company 368 Billings & Spencer Company 207 Black & Webster, Incorporated 325 Black Drill Company 303 Blake Company, Edward 245 Blanchard Machine Company 107 Blaner Spring Winder Co. (Div., Independent Machine Company) 414 Bloomfield Tool Corporation 414-416 Blue M Electric Company 317	
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80-81 Bear Manufacturing Co. 308 Behr-Manning Corporation 74 Benco Collet Manufacturing Company 77 Besly-Welles Corporation 71 Beverly Shear Manufacturing Company 368 Billings & Spencer Company 207 Black & Webster, Incorporated 325 Black Drill Company 303 Blake Company, Edward 245 Blanchard Machine Company 107 Blaner Spring Winder Co. (Div., Independent Machine Company) 414 Bloomfield Tool Corporation 414-416 Blue M Electric Company 317	
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 66-16-17 Bausch & Lomb Optical Company 80-81 Bear Manufacturing Co. 308 Behr-Manning Corporation 74 Benco Collet Manufacturing Company 77 Besly-Welles Corporation 71 Beverly Shear Manufacturing Company 90-81 Billings & Spencer Company 90-91 Bilck & Webster, Incorporated 325 Black Drill Company 303 Blake Company, Edward 245 Blanchard Machine Company 107 Blaner Spring Winder Co. (Div., Independent Machine Company) 414 Bloomfield Tool Corporation 414-416 Blue M Electric Company 75 Boyar-Schultz Corporation 117 Bradford Machine Tool Company 435 Branch Manufacturing Company 406 Branch Manufacturing Company 406 Branch Manufacturing Company 406 Brown & Sharpe Manufacturing Co. 235-237 Brown Company, Inc., Charles N. 396	
Baldor Electric Company 425 Barber Colman Company 162 163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16 17 Bausch & Lomb Optical Company 58 Bay State Abrasive Products Company 80-81 Bear Manufacturing Co. 308 Behr-Manning Corporation 77 Benco Collet Manufacturing Company 77 Besly-Welles Corporation 71 Beverly Shear Manufacturing Company 368 Billings & Spencer Company 207 Black & Webster, Incorporated 325 Black Drill Company 303 Blake Company Edward 245 Blanchard Machine Company 107 Blaner Spring Winder Co. (Div., Independent Machine Company 317 Bloomfield Tool Corporation 414-416 Blue M Electric Company 317 Boice-Crane Company 75 Boyar-Schultz Corporation 117 Bradford Machine Tool Company 435 Branch Manufacturing Company 435 Branch Manufacturing Company 435 Branch Manufacturing Company 435 Brown & Sharpe Manufacturing Co. 235-237 Brown & Sharpe Manufacturing Co. 235-237 Brown Company, Inc., Charles N. 396 Bryant Chucking Grinder Company 60-61-189	
Baldor Electric Company 425 Barber Colman Company 162 163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16 17 Bausch & Lomb Optical Company 58 Bay State Abrasive Products Company 80-81 Bear Manufacturing Co. 308 Behr-Manning Corporation 77 Benco Collet Manufacturing Company 77 Besly-Welles Corporation 71 Beverly Shear Manufacturing Company 368 Billings & Spencer Company 207 Black & Webster, Incorporated 325 Black Drill Company 303 Blake Company Edward 245 Blanchard Machine Company 107 Blaner Spring Winder Co. (Div., Independent Machine Company 317 Bloomfield Tool Corporation 414-416 Blue M Electric Company 317 Boice-Crane Company 75 Boyar-Schultz Corporation 117 Bradford Machine Tool Company 435 Branch Manufacturing Company 435 Branch Manufacturing Company 435 Branch Manufacturing Company 435 Brown & Sharpe Manufacturing Co. 235-237 Brown & Sharpe Manufacturing Co. 235-237 Brown Company, Inc., Charles N. 396 Bryant Chucking Grinder Company 60-61-189	
Baldor Electric Company 425 Barber Colman Company 162 163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16 17 Bausch & Lomb Optical Company 58 Bay State Abrasive Products Company 80-81 Bear Manufacturing Co. 308 Behr-Manning Corporation 77 Benco Collet Manufacturing Company 77 Besly-Welles Corporation 71 Beverly Shear Manufacturing Company 368 Billings & Spencer Company 207 Black & Webster, Incorporated 325 Black Drill Company 303 Blake Company Edward 245 Blanchard Machine Company 107 Blaner Spring Winder Co. (Div., Independent Machine Company 317 Bloomfield Tool Corporation 414-416 Blue M Electric Company 317 Boice-Crane Company 75 Boyar-Schultz Corporation 117 Bradford Machine Tool Company 435 Branch Manufacturing Company 435 Branch Manufacturing Company 435 Branch Manufacturing Company 435 Brown & Sharpe Manufacturing Co. 235-237 Brown & Sharpe Manufacturing Co. 235-237 Brown Company, Inc., Charles N. 396 Bryant Chucking Grinder Company 60-61-189	
Baldor Electric Company 425 Barber Colman Company 162-163 Barker Engineering Company 271 Bartelt Engineering Company 352 Bath Company, John 16-17 Bausch & Lomb Optical Company 56 Bay State Abrasive Products Company 80-81 Bear Manufacturing Co. 308 Behr-Manning Corporation 77 Benco Collet Manufacturing Company 77 Besly-Welles Corporation 71 Beverly Shear Manufacturing Company 368 Billings & Spencer Company 303 Blake Company 303 Blake Company 303 Blake Company Edward 245 Blanchard Machine Company 10 Blaner Spring Winder Co. 107 Bloomfield Tool Corporation 414-416 Blue M Electric Company 317 Boyer-Schultz Corporation 414-416 Blue M Electric Company 317 Boyar-Schultz Corporation 418 Bryant Manufacturing Company 435 Branch Manufacturing Company 435 Branch Manufacturing Company 435 Brown & Sharpe Manufacturing Co. 235-237 Brown Company, Inc., Charles N. 396 Bryant Machinery & Engineering Co. 43 Bryant Machinery & Engineering Co. 43 Bryant Machinery & Engineering Co. 43 Buckeye Tools Corp. 235	

Cadillac Stamp Company Carborundum Company, The	114
Carborundum Company, The	298
Cedar-West Tool Company, Inc.	380
Chandler Tool Company	357
Chicago-Latrobe Company	170
Thisage Sarew Company	205
Chicago Wheel & Manufacturing Co	327
Cimcool Division	321
(Cincinnati Milling Machine Co.)	197
Cincinnati Bickford Tool Company	132
Cincinnati Electrical Tool Company	436
Cincinnati Lathe & Tool Company 5	3-59
Cincinnati Milling Machine Company, Inc.	8-9
Carborundum Company, The Jedar-West Tool Company, Inc. Chandler Tcol Company Chicago-Latrobe Company Chicago Rawhide Manufacturing Company Chicago Screw Company Chicago Wheel & Manufacturing Co. Cimcool Division (Cincinnati Milling Machine Co.) Cincinnati Bickford Tool Company Cincinnati Electrical Tool Company Cincinnati Lathe & Tool Company Cincinnati Milling Machine Company, Inc. Cincinnati Milling Products Div. (Cincinnati Milling Products Div.)	250
(Cincinnati Milling Machine Co.) 197 Cincinnati Shaper Company 3	4.95
Circular Tool Company	45
	43
Clemson Brothers Incorporated	354
Cleveland Crane & Engineering Co.	142
Cleveland Tapping Machine Company	295
Cleerson Machine Tool Company Clemson Brothers Incorporated Cleveland Crane & Engineering Co. Cleveland Tapping Machine Company Colonial Bushings Incorporated Columbia Export Company Inc. Columbus Die Tool and Machine Co.	391
Columbia Die Tool and Machine Co	51
Commander Manufacturing Company	392
Comtor Company	55
Concentric Tool Cornovation	402
Connors & Davis Sales Corporation Consolidated Machine Tool Corp. Continental Machine Company	195
Consolidated Machine Tool Corp.	127
Continental Machine Company	364
Continental Tool Works (Division Ex-Cell-O Corporation)	91
Conway Clutch Company	427
Cooley Electric Manufacturing Corp. 388	-400
Cosa Corporation 2	0-21
(Division Ex-Cell-O Corporation) Conway Clutch Company Cooley Electric Manufacturing Corp. 388 Cosa Corporation 2 Covel Precision Grinders Crane Packing Company Criterion Machine Works Cro-Plate Company Cro-View Machine Tool Company	184
Crane Packing Company	431
Cro Plate Company	129
Crozier Machine Tool Company	412
	8-49
Crystal Lake Grinders	271
Dakon Tool & Machine Co	365
Danly Machine Specialties Incorporated	23
Dakon Tool & Machine Co. Danly Machine Specialties, Incorporated Davis Keyseater Company	344
Dayton Rogers Manufacturing Company	
103	421
Dearborn Company, J. W.	391
Desmond-Stephan Manufacturing Co.	340
Detroit Broach Company 3 Detroit Milling Cutter Company Detroit Power Screwdriver Company	296
Detroit Power Screwdriver Company	144
Detroit Stamping Company 318-395	-401
Detroit Stamping Company	409
Dreis & Krump Manufacturing Co.	362
Dremel Manufacturing Company	312
duMont Corporation	191
Durant Tool Supply Company	307
Dumore Company Durant Tool Supply Company Duro Metal Products Company	272
Dykem Company	411
	374
Economy Tool and Machine Company	389
Edroy Products Company Eisler Engineering Company, Inc. Ekstrom Carlson & Company	361
Ekstrom Carlson & Company	405
Elgin Tool Works	193
Elox Corporation	385
Enco Manufacturing Company 316 Ettco Tool Company Exacto Industries Incorporated	-347 123
Elico rooi Company	401



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& D Machine & Tool Works	65
airfield Gauge Company	417
amco Machine Company	41
ederal Press Company	288
ederal Products Corporation	2
elters Company	138
en Machine Company	377
idelity Chemical Products Corp.	335
ield & Son, Walter W	376
leid, Herb M.	352
iske Brothers Helining Company	285
lynn Manufacturing Company	3/2
onda Gage Sales Corp.	211
ostoria Pressed Steel Corn	202
ranklin Balmar Company	302
(N A Strand Div)	94-95
ulflo Specialties Company Incorporate	d 70
ulmer Company C Allen	7
uniter Compuny, C. Anen	
ulmer Company, C. Allen diaring Tool Company datco Rotary Bushing Company deneral Die & Stamping Company deneva Machine & Tool Corporation disholt Machine Company denerer Company, J. C. dishada Machine Tool Company	33
atco Hotary Bushing Company	304
eneral Die & Stamping Company	355
eneva Machine & Tool Corporation	100 010
isnoit Machine Company	183-217
tenzer Company, J. C.	417
lenzer Company, J. C. raham Machine Tool Company rand Tool & Supply Company rant Manufacturing and Machine Co	404 417
rand fool & Supply Company	909-917
ran Company C *	. 330
reenerd Arbor Press Company	300
rear Manufacturing and Machine Co river Company, G. A. reenlee Brothers & Company reenlee Tool Company rob Brothers robet File Company of America	90
reenles Tool Company	367
rob Brothers	406
robet File Company of America	405
all Manufacturing Comment	400
robet File Company of America all Manufacturing Company ammond Machinery Builders anchett Magna-Lock Corporation anna Engineering Works artford Special Machinery Company artmann Manufacturing Company askins Company, R. G. eimann Manufacturing Company einrich Tools Incorporated eller Brothers Company endley & Whittemore Company imoff Machine Company orton & Son Company orton & Son Company. E. owald Machine Works, W. T. owe & Fant Incorporated uppert Company, K. H. enperial Stamp & Engraving Company	406
amilton fool Company	159
ammona Machinery Builders	12
dichett Magna-Lock Corporation	209
artford Special Machinery Commen	141
artmann Manufacturing Company	404
caking Company B C	100-101
eimann Manufacturina Company	369
einrich Tools Incorporated	293
eller Brothers Company	119
lendley & Whittemore Company	350
limoff Machine Company	414
oggson & Pettis Manufacturing Co.	385
lorberg Gage Company	173
lorton & Son Company, E.	381
owald Machine Works, W. T.	380
owe & Fant Incorporated	279
uppert Company, K. H.	248
nperial Stamp & Engraving Company	202
(Blaner Spring Winder Co.)	414
adignopolie Machinery & Supply Co.	66.67
(Blaner Spring Winder Co.) ndianapolis Machinery & Supply Co. ndianapolis Machinery & Supply Co. ndustrial Diamond Powders ndustrial Products Suppliers ngersoll Milling Machine Company	A17
adustrial Products Suppliers	420
ogerall Milling Machine Company	260.B
ntoco Sales Company	96
and S Tool Company, Incorporated	42
and S Tool Company, Incorporated acobs Manufacturing Company and Manufacturing Company, B. arvis Company, Charles L. ohnson Machine & Press Corporation	93
ann Manufacturing Company, B.	291
arvis Company, Charles L.	13
ohnson Machine & Press Corporation	366
alamazoo Tank & Silo Company	
(Machine Tool Division)	208
aufman Manufacturing Co.	394
Calamazoo Tank & Silo Company (Machine Tool Division) Caufman Manufacturing Co. Caukauna Machine Corporation Cearney & Trecker Corp. Cennametal, Incorporated	215
f f f	120-121
dearney & Trecker Corp.	

Cent Machine Company	412
King, Andrew Klaas Machine & Mig., Company Kling Brothers Engineering Works	414
Class Machine & Mig., Company	250 128
(night Machinery Company W R	1
L-W Chuck Company Lapeer Manufacturing Company Lassy Tool Company Last Word Sales Company Lavallee & Ide, Incorporated Leach Machinery Company, H. LeBlond Machine Tool Co., R. K. Lee Company, K. O. Lees-Bradner Company Lehmann Machine Company Levin & Son, Incorporated, Louis	00
apper Manufacturing Company	82 311
assy Tool Company	115
Last Word Sales Company	343
avallee & Ide, Incorporated	64
eRland Machine Tool Co. R. V. 124	263 -135
Lee Company, K. O.	213
Lees-Bradner Company	423
Lehmann Machine Company	190
Levin & Son, Incorporated, Louis Lewthwaite Machine Co., T. H.	284
Lima Electric Motor Company	109
Linley Brothers Company	395
Lodding Incorporated	244
Logan Engineering Company	169
Logansport Machine Company	243 102
Lovejoy Tool Company Lucas & Son, J. L. Lucifer Furnaces Incorporated Lufkin Rule Company Luma Electric Equipment Company Lynn Manufacturing Ccmpany	416
Lucifer Furnaces Incorporated	319
Lufkin Rule Company	306
Luma Electric Equipment Company	387
Lynn Manufacturing Company	341
M.B.I. Export & Import Ltd. M & N Hydraulic Press Company	110
McCrosky Tool Corporation	415
McDonough Manufacturing Company	410
Machine Products Corporation	367
Machine Products Corporation Machine Tool Division	
(Kalamazco Tank & Silo Company)	208
Mail Tool Company	356 358
Madison-Kipp Corporation Mall Tool Company Manhattan Rubber Division	330
(Raybestos Manhattan Inc.)	204
Marshall Steel Company Marshalltown Manufacturing Company	413
Marshalltown Manufacturing Company	345
Martin Machine Works, J. E. Marvic Illustrations	417
Master Manufacturing Company	259
Masters	420
Metallizing Engineering Company	267
Michigan Chrome & Chemical Company Michigan Drill Head Company	385 257
Micro Drill Guide and Engineering Co.	409
Miller Motor Company 104	1-105
Millers Falls Company	40
Millit Incorporated	334
Minit Cutter Grinder Company Misal Machinery Incorporated	315
Misal Machinery Incorporated Modern Tool Works Mojave Granite Company	221
Mojave Granite Company	416
Mojave Granite Company Moline Tool Company Monarch Machine Tool Company 112 Mocre Special Tool Company Morse Twist Drill & Machine Company	344
Moore Special Tool Company 112	222
Morse Twist Drill & Machine Company	200
	18-19
Motch & Merryweather Mchy. Co.,	
The Motor Tool Manufacturing Company	363
Mummert-Dixon Company	376
National Acme Company National Automatic Tool Company	87
National Automatic Tool Company Nebel Machine Tool Company	192
Nelco Tool Co.	287
New Albany Machine Mfg. Company	346
New Method Steel Stamps, Inc.	352 382
Nebel Machine Tool Company Nelco Tool Co. New Albany Machine Mfg. Company New Method Steel Stamps, Inc. New Plastic Corporation Niagara Machine and Tool Works	24-25
Nichols-Morris Corporation	46
Nichols-Morris Corporation Nicholson and Company, W. H.	339





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Nielsen, Incorporated 38 Nilsson Gage Company 32 Nirol Manufacturing Company 39 Ncble & Westbrook Manufacturing Co. 5 Nobur Manufacturing Company 31 Norgren Company, C. A. 47-38 Northwestern Tool & Engineering Co. 41 Norton Company 62-63-24
Oliver Instrument Company
P. M. Company Palley Supply Company Palley Supply Company Parker Machine Company Pedraker Stamp Works Pedrick Tool and Machine Company Pines Engineering Company Inc. Pines Engineering Company Inc. Pivot Punch & Die Corporation Plunket Machine Company, J. E. Pope Machinery Corporation Portage Double Quick Tool Company Pratt & Whitney Precision Twist Drill & Machine Co. Procunier Safety Chuck Company Producto Machine Company Producto Machine Company Producto Machine Company Putnam Tool Company Putnam Tool Company Putnam Tool Company Pyrometer Instrument Co. 41 42 43 44 45 45 46 47 46 47 48 48 48 48 48 48 48 48 48
Queen City Machine Tool Company 22
R. B. Tool Company 38 R and L Tools 9 Rahn Granite Surface Plate Company 8

Raybestos Manhattan Incorporated	
(Manhattan Rubber Div.)	204
Reading Machine Company	414
Radmer Air Devices, Inc.	373
Rehnberg-Jacobson Manufacturing Co.	386
Reid Brothers' Company, Incorporated	210
Reliant Industries	160
Reltool Corporation	353
Rice Pump & Machine Company	404
Richards Company, J. A.	376
Rodgers Hydraulics, Incorporated	50
Rogers Tool Company, John M.	
Roll Feeds Corporation	286
Ross Operating Valve Company	136
Rotor Tool Company	57
Rouse & Company, H. B.	78
Royal Oak Tool & Machine Company	
Rusnok Tool Works	124
Ruthman Machinery Company	202
Rutland Tool Service	375
Ryerson and Son, Incorporated, Joseph T.	150
njerson und bon, meorporated, joseph 1.	100
S & E Machine Products Incorporated	326
S & S Machinery Company	202
Schauer Manufacturing Corporation	294
Scherr Company, Inc., George 351-414	
Schmidt, Incorporated, Geo. T. 218	-387
Schrader's Son, A.	79
Schultz & Anderson Company	232
Scully Machine Company	
Seibert and Sons, Incorporated	322
Service Machine Company	280
Sheffield Corporation	
Sheldon Machine Company	
Sid Tool Company	
Sigourney Tool Company	
	- 0 1



Simonde Saur & Steel Company	2 34 30
Size Control Company (American Gage & Machine Co.) 26	A-C
Smith & Bons incorporated, G. W.	324
South Band Lathe Works	391
Speedarin Chuck	225 359
Sperman Metal Specialties	408
Spittire Tool Company	384
Stadoil Mtg. Company	343
Standard Electrical Tool Company	305
Standard Portable Cord Company Stevens Co., John B. Stocker & Yale Incorporated Stokvis, Edera & Company Stone Machinery Company Strand Division, N. A. (Franklin Balmar Corp.) 94 Stuart Oil Company Ltd., D. A. Sturtevant Company, P. A. Sun Oil Company Sundstrand Machine Tool Company Sundstrand Machine Tool Company Suntay Company	410
Stevens Co., John B.	395
Stokuis Edara & Comporated	3
Stone Machinery Company	336
Strand Division N. A.	100
(Franklin Balmar Corp.) 94	-95
Stuart Oil Company Ltd., D. A.	125
Sturtevant Company, P. A.	344
Sun Oil Company	22
Sundstrand Machine Tool Company	212
Sunray Company Super Tool Company Sutton Tool Company Sweet & Son, E. L.	
Sutter Tool Company	53
Sutton Tool Company Sweet & Son, E. L. Syntron Company	26 420
Syntron Company	297
Syntron Company Tannewitz Works	433
Thompson & Son Company, Henry G. Thriftmaster Products Corporation	206
Thriftmaster Products Corporation	405
rise Machinery Company, Frank P.	407
Torit Manufacturing Company Tree Tool and Die Works	238
Tree lool and Die Works	126
Tubular Migrameter Company	207
Twentieth Century Manufacturing Co.	369
United States Drill Head Company	37
Tree Tool and Die Works Troyke Manufacturing Company Tubular Micrometer Company Twentieth Century Manufacturing Co. United States Drill Head Company Universal Cutter Service Universal Engineering Company	421
Van Keuren Company	300
Van Norman Company	1-15
Van Products Co. Verson Allsteel Press Company Back Co	416
Victor Machinery Eychange	379
Victor Saw Works	216
Victor Machinery Exchange Victor Saw Works Viking Tool Company	44
Vimco Manufacturing Company Vogel Tool & Die Corporation	398
Vogel Tool & Die Corporation	247
Vulcan Tool Company	228
Wahlstrom Float-Lock	313
(American Machine & Foundry Co.) Waldes-Kohinoor Incorporated	31
Walker Company, O. S.	200
Walls Sales Corporation	387
Waish Press & Die Company	
(Div. American Gage & Machine) 26	0-A
Waltham Machine Works Wardwell Manufacturing Company Warner & Swasey Company Warts Brothers Tool Works	369
Wardwell Manufacturing Company	360
Watte Brothers Tool Works	AIC
	421
Wesson Metal Corporation	28
Wesson Company	89
West Point Manufacturing Company	282
White Dental Manufacturing Co., S. S.	187
Whitney Manufacturing Company, W. A. Whitney Metal Tool Company Whitnon Manufacturing Company	352
Whitney Manufacturing Company	321
Wicaco Machine Corporation	351
Windomann Machine Company	249
Wilson Mechanical Inst. Division	
Wilson Mechanical Inst. Division (American Chain & Cable Co.) Wittek Manufacturing Company	27
Wittek Manufacturing Company	118
Yohe Supply Company Yost Manufacturing Company Zagar Tool, Incorporated	344
Zagar Tool, Incorporated	333
and an army management of the control of the contro	

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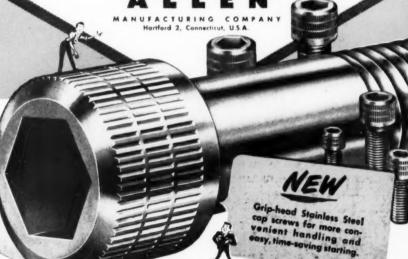
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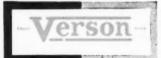
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